TEXTILES PAPER LEATHER

AMERICAN DYESTUFF REPORTER

Including the Proceedings of the
AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

VOLUME XI NOVEMBER 6, 1922 NUMBER 10

FEATURES OF THIS ISSUE

In "Chemical Research in the Power Laundry Industry," A. F. Shupp tells of the services of the Research Fellowship at the Mellon Institute to the Laundry-owners' National Association.

"Dyeing Cotton Piece Goods on the Padder," by William F. Deady, describes three types of padding machines, their application and their operation.

Part II of "Mechanical Appliances for Pumping Chemical Solutions" deals with the air jet lift, the vacuum lift, the pneumatic displacement pump, and diaphragm pumps. Many illustrations of these devices are given.

No change has yet occurred in the status of the Italian dye industry, according to Raffaele Sansone, writing from Genoa.

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The Deciding Factor

HOW to operate at a fair profit without further reduction in wages was the question before the informal conference at Blank Mills.

Agent:—"I've bought up on raw stock for the next six months. I'm convinced that the bottom of the market has been reached and all market forecasts predict an advance before long."

(Then the agent's brow clouded.)

"But it'll have to advance quite some to make us a profit and we shouldn't depend on it anyway. (Turning to superintendent.) Johnson, are you convinced that our equipment is capable of producing at minimum cost?"

Supt.:—"Absolutely. Look through the advertisements in any textile paper today and you will not find any improved machinery that's made a reputation for itself that we haven't got in our mill."

Boss Dyer:—"Excuse me, Mr. Johnson, but I'll have to qualify that statement of yours. I don't doubt but what we've got all the up-to-date machinery we need in most departments of the mill, but when it comes to the dye house I KNOW we haven't."

Supt.:—"Oh, well, that end of the job is up to you."

Boss Dyer:—"Exactly, and that's why I asked to be called in on this conference this morning. I want to say that no matter how you look at it, we ought to install Franklin Package Dyeing Machines."

Agent:—"And your reasons?"

Boss Dyer:—"Well, all you have to do is to look at a Franklin Machine to see that it takes about half the space of one of our vats. You know we need extra space.

"Then a Franklin Machine, dyeing in a steamtight kier under pressure, uses only one gallon of liquor to a pound of yarn. As a very conservative estimate this will save us several thousands a year in fuel and water. And your labor,—with Franklin Machines it doesn't have to be skilled labor and the production per man is much greater,—several more thousands a year saved."

Supt.:—"Even so, those savings will not allow us a profit at present market prices."

Boss Dyer:—"Quite so. Strange as it may seem, the greatest saving which Franklin Machines make is not in the dye house, but in eliminating expensive and wasteful methods of backwinding. If you use Franklin Dyeing you can substitute simple, direct methods of winding which in many cases have saved as much as 5 cents per pound of yarn dyed. On a basis of one million pounds per year this means an annual saving of $50,000. Suppose we only save 2 or 3 cents per pound, isn't it worth while?"

Supt.:—"Granted, BUT—(and the superintendent smiled)—are you sure that they will give us as good colors as we're getting now?"

Boss Dyer:—"Absolutely! (with an answering smile and imitating the superintendent's emphasis on the same word somewhat earlier in the conversation). Look at these samples and judge for yourself."

Agent (to superintendent):—"Johnson, I guess our boss dyer goes to the head of the class. These are some of the most brilliant and solid colors I've ever seen."

Supt.:—"Yes, I take my hat off to 'our boss dyer'—and to the Franklin Process Company too. I got the idea somehow that Franklin Machines couldn't do a top-notch job on our class of work, but these colors are better than what we're turning out now."

Agent (to superintendent):—"Very well. The meeting is adjourned. I'll get in touch with Franklin Process Company right away and if the proposition is what it certainly looks to be, we ought to be able to get production back on a paying basis and still maintain our present wage scale."

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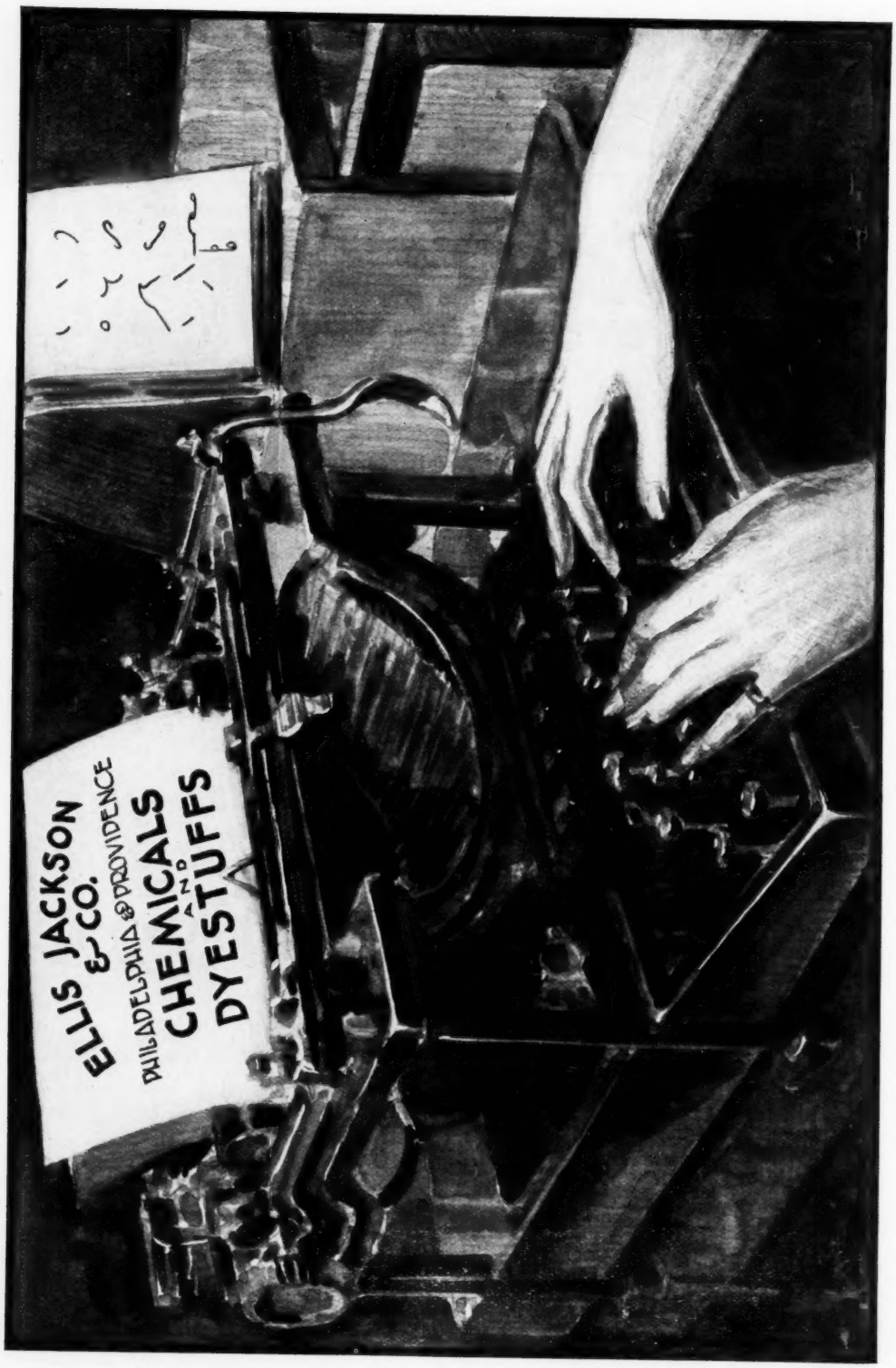
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VOLUME XI NEW YORK, NOVEMBER 6, 1922 NUMBER 10

Dyeing Cotton Piece Goods on the Padder

Three Types of Padders Generally in Use—Construction and Operation of Each Type—Applications and Advantages—Uniformity of Results

By WILLIAM F. DEADY

Slatersville Finishing Company

THE padder offers the quickest and simplest means of producing plain colors on cotton piece goods with direct dyes, and is therefore the most extensively used machine in a finishing plant for the dyeing of light and medium shades.

There are several types of padders in use, namely: the type by which the dye liquor is sprayed directly on the cloth at the nips; second, the type where the cloth passes under a roll submerged in the dye liquor of the pad box and then through the nip; and a third where the cloth passes under and over a series of rolls in the pad box before entering the nip. This type may contain two or three pad rolls. The second and third types are the older types and are in many cases being replaced by the newer first method.

Description of Padder

This first type is built along the same general lines as the last two as regards the framework. The exceptions occur in the style of the pad box, and the method of introducing the dye liquor. The pad box is fitted around the lower pad roll with an allowance of about one inch clearance on all sides. It therefore holds a very small quantity of dye liquor. The bottom roll revolving in it always carries a film of dye to the nip which saturates the cloth on one side while the spray pipe saturates it on the other.

The spray pipe is generally made of one inch brass pipe with one-sixteenth inch holes bored in a line one inch apart across the pipe. The holes should stop within three inches of either end of the pad rolls. The pipe is fitted directly in front and as close as possible to the nip, so that the stream from the holes will strike slightly above the nips. It is connected with the storage tanks which should be elevated sufficiently to give a good forceful stream to the spray.

The rolls are preferably of rubber; the bottom of harder composition than the top, so that a good squeeze may be obtained without too much wear on the rolls. They may vary in diameter from fourteen to eighteen inches, the larger size giving a greater arc of contact which tends to give better penetration.

Beginning Operations

In threading up this machine, the cloth is first passed through a tension bar, then under the spray pipe and through the nip. It is either batched up on rolls on back of the machine, or reeled into box trucks. The batching takes more time, especially on heavy goods, but brighter and deeper shades result.

Besides supplying the dye liquor, the spray pipe also acts in the dual capacity of, first, preventing the dye liquor from flowing back over the cloth unevenly, providing the tension is uniform, and second, as a guard to prevent a careless operator from getting his fingers caught in the nip.

Uniformity of Results

The main feature, however, lies in the uniformity of shades produced on this machine. As the majority of shades met with in a finishing plant require the use of two or more dyestuffs for their reproduction, and as no two dyestuffs go on the fiber at the same rate of speed, it will be seen that if the cloth is allowed to run through the dye liquor it will pick up the more rapid exhausting dye in greater quantities than the slower exhausting dye, which keeps piling up in the

pad box until gradually the shade is thrown from the original.

It was customary with the older methods to add certain percentages of the more rapid exhausting dye to the stock solution as a touch-up to keep the shade up. Also it was necessary to add water to the pad box or to add certain percentages extra of the formula to the stock solution after the pad box was filled to prevent the pieces from tapering down light. These additions are not necessary with the above method because the dye liquor strikes the cloth, practically at the nip, for a small fraction of a second, and as fresh dye is continually present, the dyestuffs in the solution do not have time to exhaust unevenly, and a careful operator can run thousands of yards and keep the shade practically uniform.

Advantages of Padder

Various classes of goods may be dyed by this method from light organdies to ten ounce ducks, providing they are well boiled out. Navy and brown and other heavy shades may be obtained by giving the goods two, three or four runs through the same liquor, and drying in between runs. Of course, the shades dyed this way are not as bright nor as fast to washing as gig dyed shades, but for many purposes they answer as well and are more uniform.

In the second type of padder, the pad box is larger and extends sufficiently far in front to permit the insertion of a small three-inch brass roll about three inches from the top. The spray pipe is similar to method one, but does not spray directly on the cloth; it simply flows into the liquor in the pad box. The cloth is threaded through a tension bar into the liquor, then under the brass roll, and up to the nip, remaining in contact with the liquor for a much longer period of time than in the previous method. It has therefore more time to absorb the more rapid exhausting dye, this being the cause for additional touch-ups to the stock solution, and addition of water to the pad box.

Of course, one becomes familiar with the dyes he uses day in and day out, and can always make the proper allowances, but this is hard work at best, new dyes always causing difficulties.

The principle of the third method is similar to that of the second, with the exception of a larger pad box and a longer contact between the dye liquor and the cloth. The same difficulties arise, and are even more pronounced, in this method, but for heavy shades in one run this is the most practical method of padding.

Announcement has been made by the Roessler & Hasslacher Chemical Company, 709-717 Sixth Avenue, New York City, to the effect that Samuel C. Harris has been appointed as Southern representative for the firm, with headquarters at 403 Clement Avenue, Charlotte, N. C. Mr. Harris will take care of the requirements of the textile trade in the Southern States at this address.

ACETOSE SILK

By J. O. Zdanowich

Since the end of the nineteenth century Schutzenberger, Girard, Liebermann, Cross and Bevan, and others have realized the importance of cellulose esters as raw material for the manufacture of artificial silk, and during the last few decades much effort has been expended on the solution of the problem of the manufacture of cellulose acetates.

Among the various suggested processes for their manufacture there is hardly any difference, as they all lead practically to the same product; that is, the acetone-soluble acetate, which is considered to be the most suitable for making artificial silk and films. In the actual manufacture, sulphuric acid is generally used as a condensing or dehydrating agent; for in spite of a number of patents suggesting the use of other less violent and energetic substances, this acid undoubtedly gives the best results.

Its action is, however, always detrimental, and great precautions are necessary to insure a constant and homogeneous product which really consists of sulphate-acetates of cellulose. As soon as the conversion of cellulose into acetate has been completed, the product is, as a rule, precipitated by water, giving a white fragile flocculent mass, which, after washing and drying, is dissolved in chloroform, tetrachlorethane or acetone. The first two of these solvents are poisonous; the last is expensive.

The above short description will sufficiently explain why cellulose acetates, although giving excellent results in the manufacture of artificial silk or films, have not up to now fulfilled expectations, nor had a fair chance of competing with other silks, in particular that made by the viscose process.

Improved Acetate Silk

Recently the writer has succeeded in manufacturing cellulose acetate silk in such a way that constant results are readily obtained on an industrial scale. The silk is tenacious and possesses good resistance toward washing, even in presence of caustic alkalis. This might be expected, as it is a pure ester of cellulose, unlike other silks, which are hydrocellulose, hence its suitability for underwear.

Further, in common with natural silk, it possesses brilliancy, fulness and softness to such a degree that it is almost impossible to distinguish it from natural silk; it is also a bad conductor of heat and can be easily dyed.

The distinctive features of the process are that it produces a real cellulose acetate and not a sulphate-acetate, because the amount of sulphuric acid used is negligible. On the other hand, the cellulose itself, in whatever quality it may be employed, being in contact with only a small

quantity of sulphuric acid, is not appreciably affected, a fact which makes the handling of the materials simpler and more reliable. Moreover, the acetylation proceeds very smoothly, and the completion of the reaction is indicated when the last traces of cellulose enter into a clear, colorless, very visious solution in acetic acid. This solution, unlike other cellulose acetate solutions, is very stable, and is used directly for spinning (after having been filtered and subjected to the extraction of air bubbles).

The thread produced coagulates very quickly, and after simple washing and drying is ready for use.—Journal of the Society of Dyers and Colourists.

Benefits to be Derived from a Standard Raw Silk Classification

No Specifications To-day for Raw Silk—Manufacturer Buys Pig in a Poke—Advantages of Standardizing Grades in Determination of Contract Violations—Specifications Suggested by Experimental Tests

By L. C. LEWIS

Lewis Testing Company, New York City

NEARLY every raw material at present is bought from specifications, but with raw silk, manufacturers buy a pig in a poke. Every raw silk inspector in Yokohama has different methods of inspection and the result is that there is great confusion as to just what a crack double extra is.

If a standard method of inspection were to be developed, a manufacturer could state the number of very fine ends, fine ends, coarse ends, very long knots, waste, slugs, split ends, bad throws, long knots, corkscrews, loops, and nibs, that he would expect in a certain grade. He would also be able to state the average cohesion that he would require, giving a maximum and minimum number of strokes allowed. He also would be able to give the number of breaks that he would expect from his winding test.

When a manufacturer wished to buy raw silk, he then could draw up the specification to be given to the importer to be filled. When the silk was delivered it could easily be tested to see if the contract had been kept. To-day it is a matter of price, and usually the importer who can sell the cheapest, regardless of quality, gets the business. Below are specifications for various grades of raw silk as found from a number of tests:

Average Number of Defects as Found in the Different Quantities of 13 to 18 Denier Japan Raw Silk in 30,000 Yards

	Grand XX	Double Extra	Extra Best	No. 1/X	Best No. 1	No. 1
Number of tests.	11	102	241	209	113	44
Very fine ends..	1	1	2	3	6	8
Fine ends	2	4	5	7	10	12
Coarse ends	3	4	6	9	10	14
Raw knots	14	14	15	12	12	11
Large knots	1	1	1	2	5	7
Very large knots ..		1	1	1	3	5
Waste	1	1	1	1	1	1
Slugs	12	12	15	18	29	41
Bad throws	1	1	1	3	5	9
Corkscrews	15	15	18	21	21	20
Split ends	1	1	1	1	2	3
Loops	23	31	39	49	63	91
Nibs	26	38	45	55	70	77
Total	97	123	149	187	241	297

Average Number of Defects as Found in 18 to 25 Denier Japanese Raw Silk in 30,000 Yards

	Grand XX	Double Extra	Extra Best	No. 1/X	Best No. 1	No. 1
Number of tests.	3	26	44	25	11	3
Very fine ends..	..	1	1	2	2	7
Fine ends	1	2	4	4	5	7
Coarse ends	3	4	5	6	10	7
Raw knots	15	18	18	17	15	8
Large knots	1	1	1	1	1	6
Very large knots ..		1	1	1	1	5
Waste	..	1	1	1	1	..
Slugs	10	11	11	21	22	21
Bad throws	1	1	2	2	4	6
Corkscrews	7	9	12	12	18	12
Split ends	1	1	1	1	1	1
Loops	10	25	40	27	55	66
Nibs	9	27	38	26	47	45
Total	63	98	133	120	182	191

DEDICATE MILLION-DOLLAR LABORATORY AT BUFFALO UNIVERSITY

Foster Hall, the million-dollar chemical laboratory of the University of Buffalo, designed especially to meet the needs of the electrochemical, hydroelectric, dye and steel industries on the Niagara frontier, was dedicated at Buffalo on October 27.

Chemical Research in the Power Laundry Industry

Magnitude of the Laundry Industry—Need of Technical Counsel—Laboratory Service for Laundry Owners —Effect of Bleaching on Cotton—Use of Low Titer and High Titer Soaps—Bentonite as a Detergent

By A. F. SHUPP

Director, Department of Chemical Engineering, Laundryowners' National Association

A Paper Read Before the Dye Section, American Chemical Society, at the Pittsburgh Meeting

THERE are approximately six thousand power laundries in the United States doing annually a gross business of about $250,000,000 in value. This industry consumes annually close to $3,000,000 worth of soap along with an equal expenditure of money for sodas, starches, bleaches and acids. A rough estimate shows us that the power laundries in this country use about thirty million gallons of water daily for doing less than an estimated 15 per cent of the nation's laundering.

Consider, for a moment, that in some localities the water is soft and free from suspended matter, while elsewhere it may have a hardness of forty grains per gallon and be heavily laden with solids, in addition to which there may be other factors which affect the quality as a laundry supply.

Other raw materials, such as soap, etc., have varied in quality to almost as great a degree in their adaptability for laundry consumption as the water.

Need of Technical Advice

The chemist may realize instantly that our laundry industry must have need of some kind of technical service. Not every power laundry is financially able to support a control and research laboratory of its own. It may, therefore, be of interest to you to hear how the laundry owners have made it possible for their industry to obtain technical assistance.

There is an association of laundry owners known as the Laundryowners National Association which has among its membership about seventeen hundred laundry owners, or one-fourth of the laundry owners in the United States and Canada. This association has maintained a research fellowship at the Mellon Institute of Industrial Research, Pittsburgh, Pa., for more than eight years. In fact, it is the research activities which keep this association alive and in a flourishing condition. Furthermore, a good example is made for other trade associations to emulate.

Laboratory Service

We shall briefly describe a few of the services which the laboratory has rendered this particular industry:

1. Analyses of water are made and advice rendered for making it fit for use.

2. Standard specifications have been compiled whereby supplies are purchased.

3. Standard washing formulas have been developed for the purpose of laundering fabrics with the least possible damage to the fibers.

As an example of what I mean, I may cite a woolen sweater which has evidently been washed with an alkaline soap when it should have been treated in a neutral soap solution. The wool has a harsh feel, suggesting such mistreatment. Furthermore, the sweater has shrunk to about one-half its original size, due, most likely, to excessive pounding in the wash wheel and subsequent drying to bone dryness in the dry tumbler. At any rate, we know that the treatment alluded to will invariably shrink woolen garments very decidedly.

As another example we have a shirt of cotton warp and silk filling threads. The shirt is in shreds because it has been washed in an alkaline soap solution. The silk threads are yellow and tender, a condition readily caused by a highly filled soap. I cannot understand why silk was used for the filler threads in this fabric, for it does not have the appearance of a silk garment, and furthermore there is no label on the shirt warning the consumer to wash it in a neutral soap.

Effect of Bleaching on Cotton

Woolen and silk garments, of course, should not be bleached with hypochlorite, although cotton and linen are so treated. The laundryman is taught to use hypochlorite with discretion. The following data illustrate the action which hypochlorite has on a cotton fabric in the course of the laundering process:

The samples of cotton sheeting were bleached in each case in a bath containing 0.01 per cent available chlorine, which approximates the strength usually used in the laundry.

No. 1. The samples were bleached for fifteen minutes at 150 deg. Fahr. after the soap and soda had been rinsed out. Laundered twenty-five times.

No. 2. The samples were bleached for fifteen minutes in the "suds." The suds bath was a 1/10 per cent

solution of a mixture of neutral, 88 per cent soap and 58 per cent soda ash in the proportion of three to one. The samples were laundered twenty-five times.

The only difference between No. 1 and No. 2 is that in No. 1 the bleach went into the rinse, but in No. 2 it went into the suds.

Tensile Strength of Inch Strip in Pounds

	Warp	% Loss	Filler	% Loss
Original	48	....	43.0	..
No. 1	48	....	40.0	7
No. 2	41	14.5	33.5	23

An unbleached sample of cotton cloth was thoroughly bleached by twelve launderings by process No. 1, while by No. 2 process it was bleached equally white in five launderings.

As a general procedure the bleach is applied for five minutes in a rinse after the soap and soda have been pretty thoroughly removed from the fabric but occasionally when table linen, for instance, is heavily stained with substances that will not wash out or bleach out readily in five minutes, the laundryman is tempted to bleach for fifteen or twenty minutes in the suds. If it were not for these stains bleaching would be unnecessary. The laboratory has taught the laundry to bleach for the minimum length of time allowed by the stains which must be removed from the fabric.

Use of Low Titer and High Titer Soaps

We have recently made a study into the surface tension of soap solutions at different temperatures with the following data as a result:

Surface tension of water in dynes per cm. at 25°C..	77
Surface tension of 0.05% sodium oleate in dynes per cm. at 25°C.....	30
Surface tension of 0.05% sodium oleate in dynes per cm. at 60°C.....	30
Surface tension of laundry soap, titer 42°, in dynes per cm. at 25.C.....	35
Surface tension of laundry soap, titer 42°, in dynes per cm. at 50°C.....	32
Surface tension of laundry soap, titer 42°, in dynes per cm. at 60°C.....	29
Surface tension of laundry soap, titer 42°, in dynes per cm. at 80°C.....	29

(Surface tension measurements were made with the Du Nouy surface tension apparatus.)

Raising the temperature of the sodium oleate solution above 25 deg. Cent. did not lower its surface tension, whereas the higher titer soap solution showed a lowering in surface tension as the temperature was raised.

Emulsifying Action of Low and High Titer Soap on Cocoanut Oil

No. 1	No. 2
100 cc. distilledwater.	100 cc. distilled water.
1 cc. 5% sodium oleate.	1 cc. 5% laundry soap, titer 42°.
¼ cc. cocoanut oil.	¼ cc. cocoanut oil.

The two mixtures were shaken in cylindrical bottles of about 1½-inch diameter until the maximum lather was obtained.

No. 1 yielded at 23 deg. Cent. a two-inch lather; at 50 deg. Cent. a two-inch lather. No. 2 yielded at 23 deg. Cent. a quarter-inch lather; at 50 deg .Cent. a one-inch lather.

The same type of test has been made with higher concentrations of cocoanut oil and with suspensions of clay or bone black. Raising the temperature of the higher titer soap mixture always produced a more abundant lather than was gotten at lower temperatures. The oleic acid soap mixture lathered as freely at room temperature as at 50 deg. Cent.

Since in laundering as well as for toilet purposes, soap is always applied to the point where a free lather is obtained, it is important to know something about the relation between the surface tension, the titer, and the temperature at which certain soaps should be used. The foregoing data indicate that sodium oleate would do as good a job of washing at room temperature as at 50 deg. Cent., but that a soap of titer 42 deg. should be used not under 60 deg. Cent. Practical washroom tests have demonstrated that the very low titer soap should be used at about 100 to 120 deg. Fahr., and the high titer one between 140 and 160 deg. Fahr. The very low titer soap may be used at room temperature but for an occasional encounter with a substance like paraffin which must be placed in a bath hot enough to melt it before it can be washed from the fabric.

Bentonite as a Detergent

Many claims have been made in favor of one form or another of the bentonite clays. Our laboratory has made an exhaustive study of this material in the hope that it might prove to be of some value in the laundry washroom. A detergent for general purposes must be able to emulsify fats and oils and also to wet solids such as sand or coal dust. Both soap and alkalies individually or separately will emulsify oils or fats in water solution. But soap is required to quickly and thoroughly wet very finely divided coal dust. Bentonite and water will not act as an emulsifying agent for oils or fats nor will they readily wet finely divided coal dust. It might be supposed that thoroughly hydrated bentonite might absorb oils or fats from a water "solution," but it does not do so to an extent warranting its use as a detergent for laundry purposes.

4. A booklet, A Manual of Standard practice for Power Laundry Washroom, has been published. The subject matter of the manual deals in an elementary manner with such topics as Water Softening, Composition of Soaps, Sodas, Sours, Starches, Bleaches and Sanitation.

5. The Conservation of Textiles is another booklet which the laboratory has published. Here an attempt has been made to tell laundry owners something about the nature of cotton, linen, wool, silk and artificial silk. Some features relating to the structure of fabrics are discussed in a manner that shows the difference between a good and a poor cloth.

The result of this publication is that we are continually receiving exhibits of inferior fabrics through laundries from all parts of the United States and Canada. We are, therefore, in a position to get a good line on the quality of all sorts of textile products on the market.

I have shown a few examples of the manner in which the laundry sometimes makes mistakes in the laundering of fabrics; now I shall cite several samples of fabrics before me which have received mistreatment somewhere in the finishing and dyeing operation:

1. A new bath towel which had been badly overbleached, a rather common occurrence.

2a. A sample of shirting from which the black threads have been removed by laundering. The black threads had been dyed with a sulphur black and tendering of the fiber had taken place.

2b. A towel with a broad red stripe through the middle. The red threads washed out. The dye is evidently a para red. These red threads had also been tendered.

3. A silk shirt which has gone to shreds. This shirt is now very flimsy but when marketed it was heavily loaded with some kind of filler. The filler washed out and the fabric failed.

4. A towel which has paper threads for filler. A piece of an 8x10 rug with paper filling threads.

5. A piece of table linen with an embossed design. The design comes out on wetting.

6. Samples of six different brands of underwear ranging in price from $1.50 to $3.50 per garment. These garments were cut in half. One piece was kept as a check and the other laundered twenty-five times. It is interesting to note the wide variation in color between these garments from a deep gray to yellow. Only one of the entire lot is what would be regarded as a beautiful white garment. It retails at $2.25. The selling cost of these garments seems to be no index of the manner in which they will wear nor of the appearance of them after a few launderings.

We refer to these samples of underwear merely as an example of what is commonly true about textile products in general. There is a lot of attention given by the manufacturing industries to the kind of raw cotton staple which is put into the garment but it is from the standpoint of the ease and efficiency by which the raw fiber may be converted into a marketable fabric.

Textile products come too close to being an "absolute necessity" to allow of their manufacture without correlating in some way their retail cost with the service they will render in the hands of the consumer.

We are devoting a lot of time toward the purpose of standardizing dyes which are to be used to beautify fabrics. The laundry industry would benefit immeasurably if every dyed garment would be fast to washing. This industry would benefit even more if every fabric, upon which a dye is placed, were worthy of the expense of dyeing it. Many good fabrics are spoiled because of being colored with poor dyes. There are also good dyes wasted on structurally poor fabrics.

CHLORIDES IN WARP SIZING

By Howard File, Chemist

The damage done to cloth in the finishing process due to the presence of certain chloride compounds in warp sizing mixtures is generally well understood. There have been a number of articles on this subject published, and texts on finishing and sizing have given much space to it. But damages of this nature still occur more or less frequently.

That such cases occur brings out the fact that there are some mill operators who are not familiar with the action of these chlorides in the finishing process or, on the other hand, are not familiar with sizing materials they are using.

The chlorides most frequently used in sizing preparations are magnesium, zinc and calcium chlorides. They are the production of the combination of the metals magnesium, zinc and calcium with chlorine or hydrochloric acid. The reason that they cause trouble is because of the fact that they decompose easily under the influence of moisture and heat. The magnesium and zinc chlorides break down much more readily than does the calcium, and it is these two that cause most of the trouble. In fact, it is doubtful if calcium chloride would give trouble, except under extreme conditions, if it did not contain magnesium chloride as an impurity. However, all three of these compounds do break down under the influence of heat and water or steam, and the chlorine or hydrochloric acid liberated by this decomposition will attack the cotton and tender it. The amount of damage will increase with the degree of heat and the amount of chlorides present.

Magnesium and calcium chlorides are used in size preparations because of their affinity for water, and their presence helps the cotton yarn to take up the moisture natural to it that has been driven off by the heat of the slasher drums. Zinc chloride also has this property of taking up moisture, but is generally used because of its antiseptic value in preventing molds or mildew. These chlorides would not decompose so easily if it were not for the presence of the moisture they take up. We do not

(*Continued on page* 356.)

Mechanical Appliances for Pumping Chemical Solutions

Part II

The Air Jet Lift—Solution of a Typical Air Jet Lift Problem—Agitation of Chemical Liquids—The Vacuum Lift—The Pneumatic Displacement Pump—Diaphragm Pumps

By A. K. FISCHER

President, Schutte & Koerting Company, Philadelphia, Pa.

THE air jet lift is a simple device for lifting liquids by means of compressed air. It consists briefly (see *Fig.* 13) of a compressed air pipe, a discharge pipe and the air jet lift proper (see *Figs.* 14, 15 and 16).

Fig. 17 is a typical installation where both the compressed air pipe and the discharge pipe are immersed in

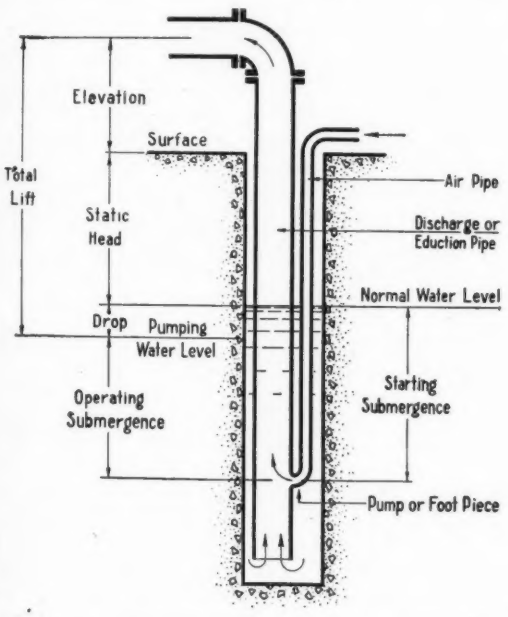

FIG. 13—*The Essential Elements of an Air Jet Lift—Note the Discharge Pipe, the Compressed Air Pipe, and the Footpiece or Pump Proper*

liquid in a well. Compressed air is forced through the air pipe and air jet lift into the discharge pipe, where it is thoroughly mixed with the liquid to form a complete emulsion of air and liquid. This mixture has a lower density or less mass per unit volume than the liquid in the well outside the discharge pipe. Thus an unbalanced hydrostatic pressure is created that is sufficient to force the mixture of air and liquid through the discharge pipe. This discharge is further assisted by the kinetic energy, or energy due to the upward motion of the compressed air, which, as it rises in the discharge pipe, expands and

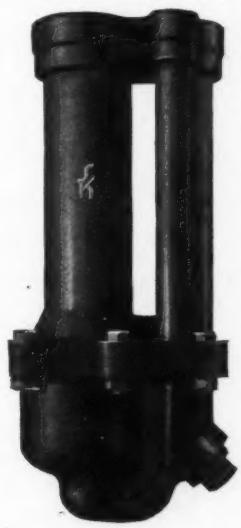

FIG. 14—*Cast-Iron or Brass Air Jet Lift in Which the Liquid Is Passed to the Pump by a Pipe*

imparts velocity to the liquid. The air jet lift is, in fact, an air expansion pump.

To operate the air lift, it is merely necessary to open a valve in the compressed air line. The quantity of liquid discharged is regulated by increasing or decreasing the air supplied.

An installation in which the liquid to be elevated is carried to the pump by means of a separate pipe is shown in *Fig.* 18.

The value of the air jet lift lies in its simplicity, durability, reliability, low maintenance cost and flexibility. It can be made of cast iron, cast steel, bronze, Monel, hard lead, hard rubber and porcelain. Air jet lifts of lead and hard rubber are shown in *Figs.* 19 and 20, respectively. These are used for pumping acids and corrosive liquids, and for agitating chemicals in textile mills, dye works, bleaching works, etc.

The air jet lift works as long as air and liquid are carried to the device. It occupies small space; but in order to operate successfully it requires the proper sub-

FIG. 15—*Cast-Iron or Brass Air Jet Lift for Deep Well Pumping*

mergence, which is often a disadvantage that precludes its use in certain instances.

To enable the reader to become familiar with the usual

FIG. 16—*Lead Air Jet Lift for Pumping Acids and Corrosive Liquids*

procedure in solving air jet lift problems, a concrete case will now be considered.

Suppose that a chemical solution, of specific gravity unity, is to be elevated 20 feet to the top of a tower, as in *Fig.* 21, at the rate of 15 gallons per minute, at what depth below the center of the liquid supply pipe must the pump proper be installed in order to obtain the necessary submergence to raise the liquid to the required height? Furthermore, at what pressure must the com-

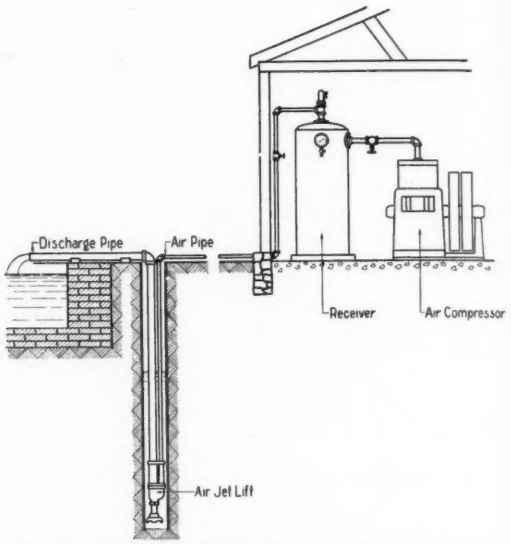

FIG. 17—*A Typical Application of the Air Jet Lift in Which the Pump Is Wholly Immersed in the Liquid to Be Elevated*

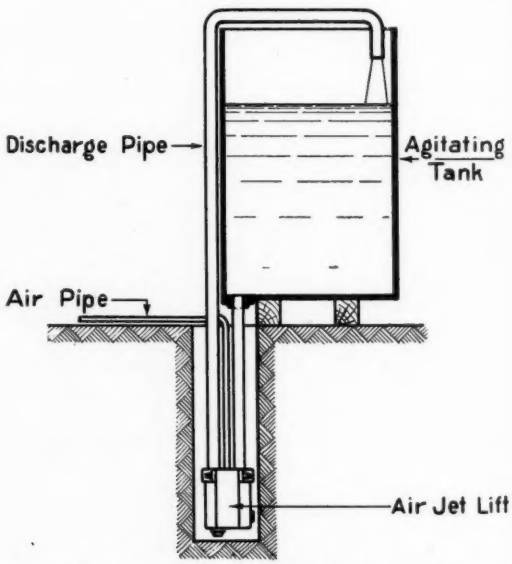

FIG. 18—*An Air Jet Lift Made of Hard Rubber. Both the Compressed Air and the Liquid to Be Raised Are Passed to the Pump by Means of Pipes*

pressed air be supplied, and what is the power consumption in compressing this air to the desired pressure?

The total lift or height above the liquid supply pipe to which the liquid must be raised is 20 feet. This is defined as the total lift. Hence, from *Table IX* the percentage submergence is 70.

TABLE IX

PERCENTAGE SUBMERGENCE

Lift Test	Submergence (per cent)
20 to 50	70
51 to 100	67

101 to 150	65
151 to 250	60
251 to 350	55
351 to 500	50
501 to 700	45
701 and above	40

Percentage submergence is defined as the ratio of the operating submergence to the operating submergence plus the total lift. Expressed algebraically, this definition becomes:

$$\text{Percentage submergence} = \frac{S_2}{S_2 + L}$$

in which S_2 is the operating submergence—that is, the distance below the center of the liquid supply pipe at which the pump proper must be installed—and L the total lift. Obviously, in an installation of which *Fig.* 21 is typical it must be practical to locate the air jet lift at the necessary depth below the supply pipe in order to raise the liquid to the desired height. In instances of this kind, both the liquid to be pumped and the compressed air are passed to the pump proper by means of separate pipes. In installations of which *Figs.* 13 and 26 are typical, the pump is wholly immersed in the liquid and no liquid supply pipe is necessary.

Coming back to the preceding equation and substituting therein the values of the total lift and percentage submergence, we have:

$$0.70 = \frac{S_2}{S_2 + 20}$$

$$S_2 = 47$$

That is, the pump must be installed 47 feet below the supply pipe.

Neglecting losses, the working air pressure in pounds

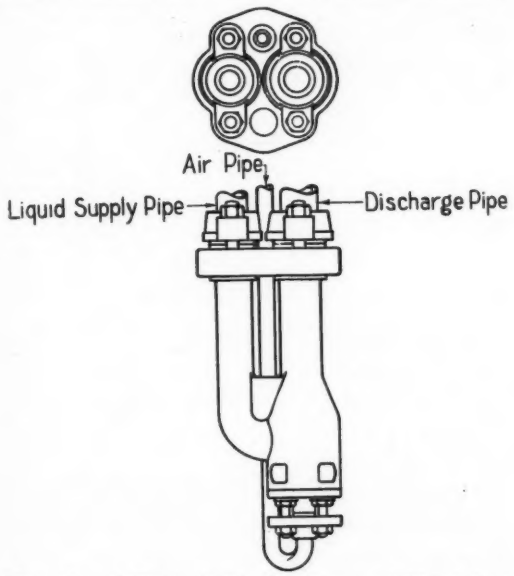

FIG. 19—*A Typical Air Jet Pump of Hard Lead*

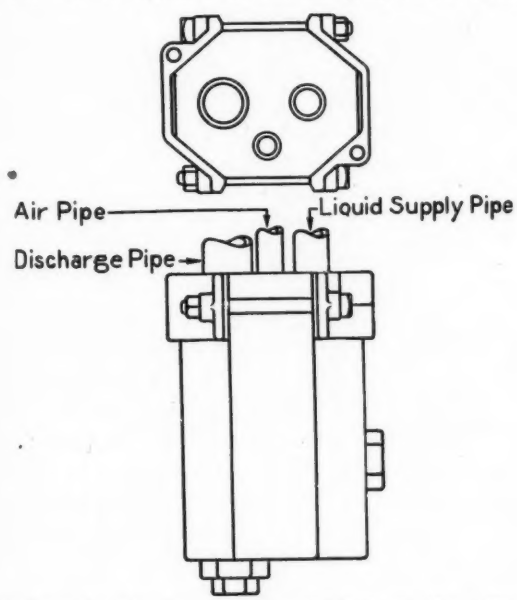

FIG. 20—*An Air Jet Lift Pump Made of Hard Rubber*

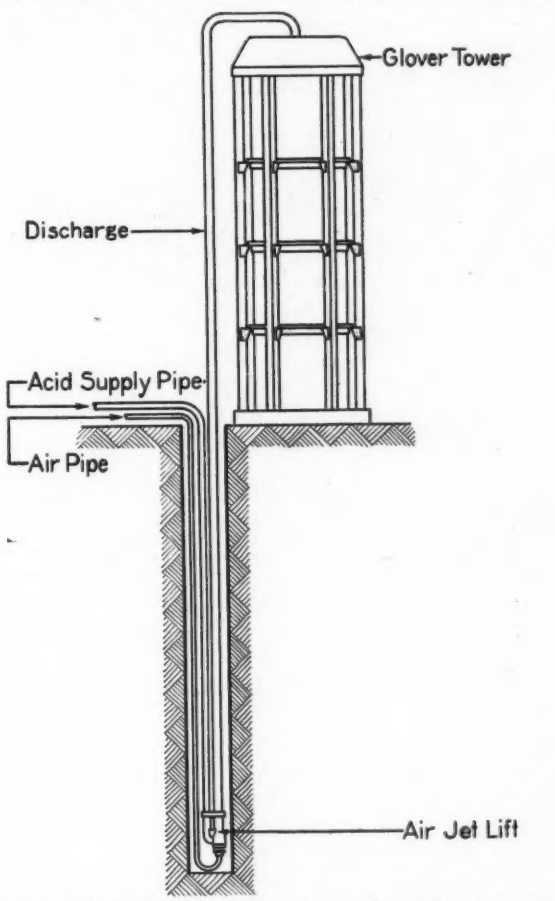

FIG. 21—*Air Jet Lift for Elevating Acid to the Top of a Glover Tower*

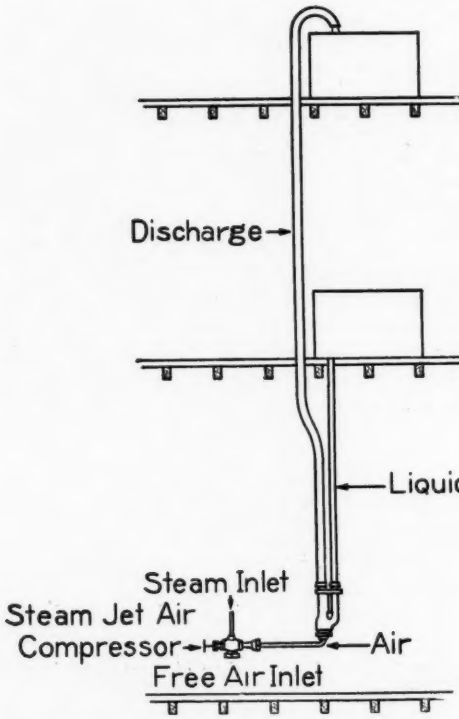

FIG. 22—*Air Jet Lift for Raising Liquid from One Tank to a Higher Tank*

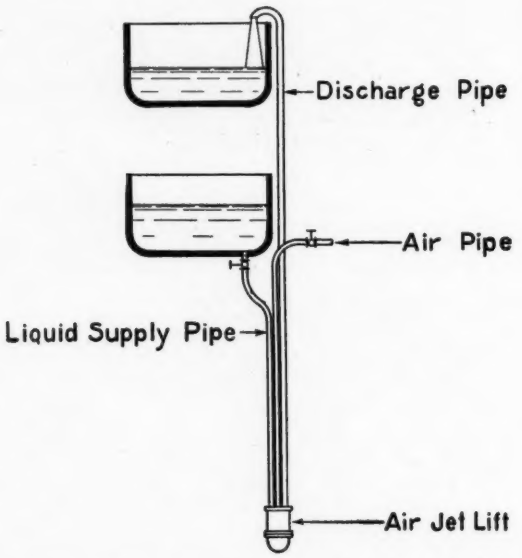

FIG. 23—*Another Application of the Air Jet Lift for Transferring Liquids from One Tank to Another*

per square inch is found by means of the following equation:

$$P_2 = \left(S_2 - \frac{V_2}{2g}\right) \times 0.45$$

in which P_2 = the working air pressure in pounds per square inch.

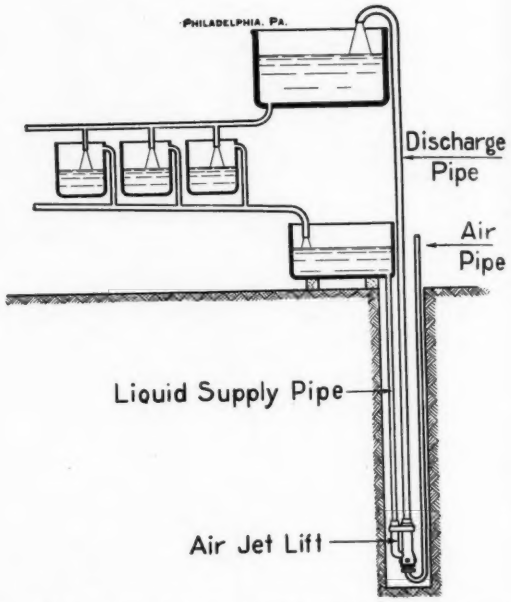

FIG. 24—*Typical Application in Which the Liquid Is Raised to a Distribution Tank*

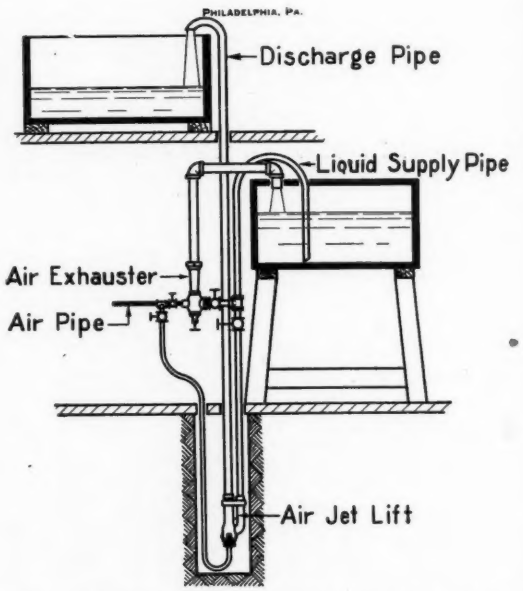

FIG. 25—*Another Application of the Air Jet Lift for Elevating a Liquid from One Tank to Another. Here the Compressed Air is Supplied by Means of an Air Jet Instead of the Customary Compressor*

S_2 = the operating submergence in feet.
V = the upward velocity of the liquid in the discharge pipe in feet per second.
g = 32.16 feet per second.
0.45 = the weight in pounds of a column of the liquid 1 foot high and 1 square inch in cross-section.

Submergence Feet	Specific Gravity Of Liquid.											
	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9
10	4.16	4.68	5.20	5.72	6.24	6.67	7.28	7.80	8.32	8.84	9.36	9.88
20	8.32	9.36	10.40	11.44	12.48	13.52	14.56	15.60	16.64	17.68	18.72	19.76
30	12.48	14.04	15.60	17.16	18 72	20.28	21.84	23.40	24.96	26.52	20.08	29.64
40	16.64	18.72	20.80	22.88	24.96	27.04	29.12	31.20	33.28	35.36	37.44	39.52
50	20.80	23.40	26.00	28.60	31.20	33.80	36.40	39.00	41 60	44.20	46.80	49.40
60	24.96	28.08	31.20	34.32	37.44	40.56	43.68	46.80	49.92	53.04	56.16	59.28
70	29.12	32.96	36.40	40.04	43.68	47.32	50.96	54.60	58.24	61.88	65.52	69.16
80	33.28	37.44	41.60	45 76	49.92	54.08	58.24	62.40	66.56	70.72	74.88	79.04
90	37.44	42.12	46.80	51.48	56.16	60.84	65.52	70.20	74.88	79.56	84.24	90.92
100	41.60	46.80	52 00	57.20	62.40	67 60	72.80	78.00	83.20	88.40	93.60	98.80
110	45 76	51.48	57.20	62.92	68.64	74.36	80.08	85.80	91.52	97.24	102.96	108.68
120	49.92	56.16	62.40	68.64	74.88	81.12	87.36	93.60	99.84	106.08	112.32	118.56
130	54.08	60.84	67 60	74.36	81.12	87.88	94.64	101.40	108.16	114.92	121.68	128.44
140	58.24	65.52	72.80	80.08	87.36	94.64	101.92	109.20	116.48	123.76	131.04	138.32
150	62.40	70.20	78.00	85.80	93.60	101 40	109.20	117.00	124.80	132.60	140.40	148.20
160	66.56	74.88	83.20	91.52	99.84	108.16	116.48	124.80	133.12	141.44	149.76	158.08
170	70.72	79.56	88.40	97.24	106.08	114.92	123.76	132.60	141.44	150.28	159.12	167.96
180	74.88	84.24	93.60	102.96	112.32	121 68	131.04	140.40	149.76	159.12	168.48	177.84
190	79.04	90.92	98 80	108.68	118.56	128.44	138.32	148.20	158.08	167.96	177.84	187.72
200	83.20	93.60	104 00	114.40	124 80	135.20	145.60	156.00	166.40	176.80	187.20	197.60

TABLE X—*Air Pressure Pounds per Square Inch*

If the initial velocity of the liquid rising in the eduction pipe is 8 feet per second, a value that is based on the actual performance of a large number of similar installations, the pressure in pounds per square inch is:

$$P_2 = \left(S_2 - \frac{V_2}{2g}\right) \times 0.45$$

$$= 47 - (64 \div 64) \times 0.45$$

$$= \text{about } 21 \text{ pounds per square inch}$$

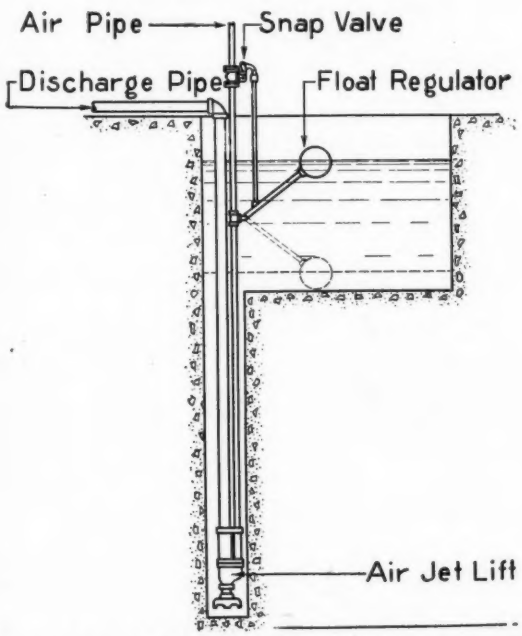

FIG. 26—*Air Jet Lift Controlled by Means of a Float Regulator and Snap Valve*

According to *Table X*, for a submergence of 47 feet and a specific gravity of 1, the required air pressure is 24 pounds per square inch, taking into account the losses.

The quantity of air required is approximately determined as follows:

$$A = \frac{WL}{20}$$

in which A = the quantity of free atmospheric air under standard conditions of pressure and temperature in cubic feet per minute.

W = the quantity of liquid in cubic feet per minute.

L = the total lift above the mean elevation of the liquid supply in feet.

In the problem considered--

$$A = \frac{15}{7.48} \times \frac{20}{20}$$

= 2 cubic feet of free atmospheric air per minute.

The factor 7.48 is used in order to convert the liquid from gallons per minute into cubic feet per minute.

From *Fig.* 27 the horse-power required to compress 1 cubic foot of free air to 21 pounds working pressure is, by interpolation, about 0.115 horse-power. To compress 2 cubic feet per minute, the total power required is $0.115 \times 2 = 0.2$ horse-power.

In connection with a Glover tower (see *Fig.* 21), the discharge pipe is extended to the top of the tower and thereupon arranged to discharge against a plate that distributes the solution uniformly over the towers.

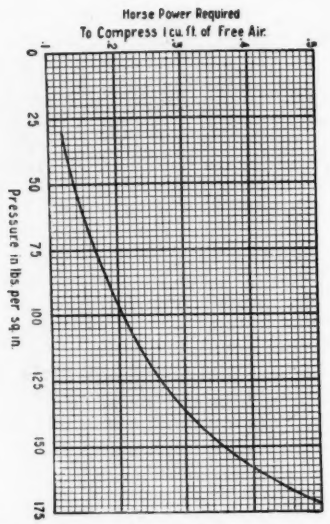

FIG. 27—*Horse-power Required to Compress One Cubic Foot of Free Air*

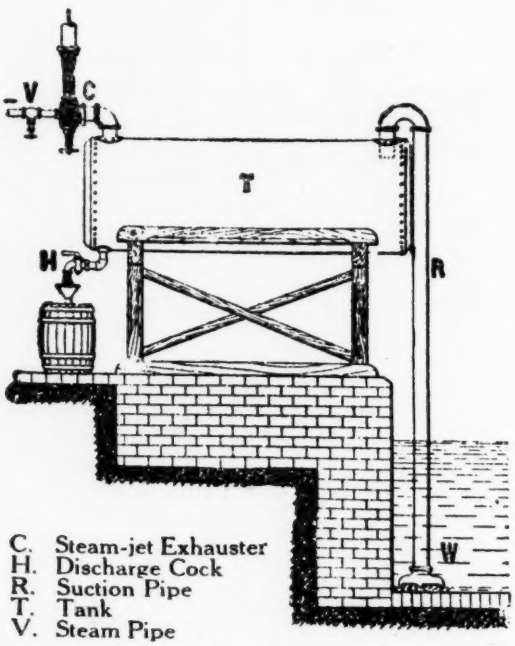

FIG. 28—*Vacuum Lift Installation*

Fig. 18 is an application of a hard rubber air jet lift for agitating a chemical liquid. For this purpose the air lift is superior to mechanical means of stirring, inasmuch as it does not introduce into the liquid any foreign injurious substances, such as dirt, oil or grease.

Fig. 22 is a typical installation for lifting a chemical solution from a tank on a lower floor to another tank on a higher floor. *Fig.* 23 shows how the air life is used for transferring a solution from one vessel to another. *Figs.* 24 and 25 are obvious applications. *Fig.* 26 shows the air jet lift with an automatic regulator, whereby the air lift is started up when the float reaches its highest position and shut down when the float falls to its lowest position.

B—Vacuum Lift

The so-called vacuum lift is a very simple means of elevating certain chemical liquids. It consists of an elevated tank and a steam jet exhauster or air jet exhauster for maintaining the tank under vacuum. After the tank has been filled, the exhauster is shut off and atmospheric air automatically introduced into the tank through the exhauster, thereby destroying the vacuum and allowing the liquid to flow by gravity to the process tanks.

The vacuum lift is used for emptying acid drums and for lifting very heavy viscous liquids in small capacities. *Fig.* 28 is a typical installation.

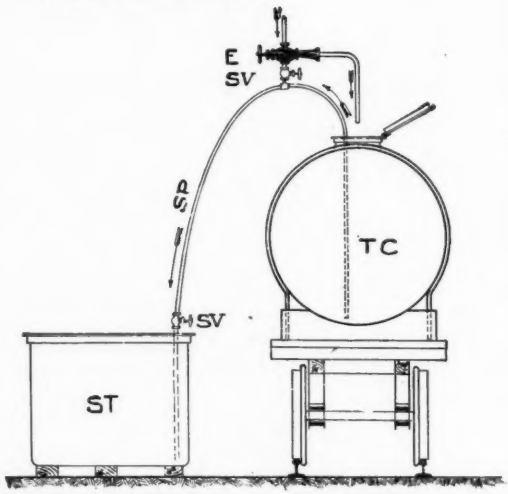

FIG. 29—*Transferring Liquids by the Vacuum Lift*

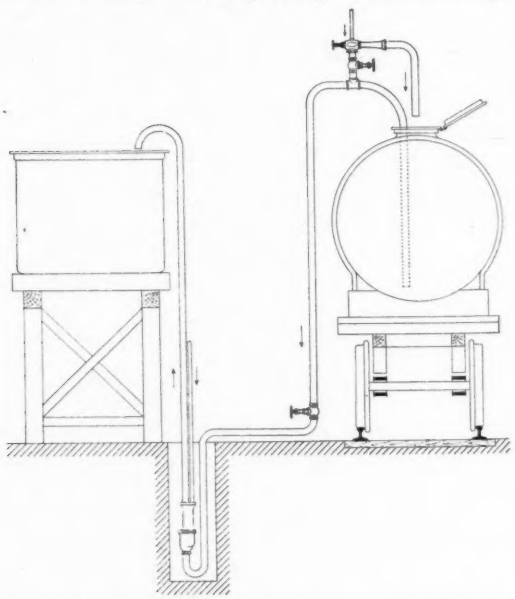

FIG. 30—*Another Typical Application of the Vacuum Lift*

(*Continued on page* 349.)

Proceedings of the American Association of Textile Chemists and Colorists

The American Association of Textile Chemists and Colorists

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NOTES ON MEETING OF NORTHERN NEW ENGLAND SECTION

The October meeting of the Northern New England Section, American Association of Textile Chemists and Colorists, was held at the Engineers' Club, Boston, Mass., on October 21. Sixty-three members and guests gathered for a social half hour and dinner, and then were addressed by S. W. Robinson, with the Hanovia Chemical & Manufacturing Company, Newark, N. J. Mr. Robinson had for his subject "The Testing of Dyes and Their Fastness to Light Under the Quartz Mercury Arc Lamp."

The speaker called attention to some of the factors involved in testing by sunlight and by artificial illuminants, and emphasized some of the difficulties encountered in attempting to establish a satisfactory ratio between the relative fading powers of sunlight and artificial lights. He further spoke of the chemical effects of ultraviolet light, the influence of chemical constitution of the dyestuff on absorption spectra and upon fastness to light, and the extremely important role of catalysis in the chemical reactions of photochemistry. Mr. Robinson's paper will undoubtedly appear in full in a later issue of the Proceedings.

Following his talk, Mr. Robinson gave a very interesting demonstration with the water-cooled quartz mercury vapor lamp. He exposed different solutions, such as quinine sulphate, yellow anthracene, fluorescein, beta-naphthol, etc., some of which showed fluorescence, others phosphorescence, or absorption. Similarly the effects of the light upon a large number of dyed materials from a commercial color card were illustrated. Some of these showed marked fluorescence and some a little phosphorescence. A most striking example of the fading power of the lamp was obtained from the results of a ten-minute exposure of dyed samples from a commercial color card, picked at random by the Chairman, Mr. Christison. The dyestuff on the exposed half of the sample appeared almost completely destroyed and presented such a vivid contrast to the unexposed half that many murmurs of surprise sounded from the audience. As further evidence of the strength of the light, the speaker exhibited skin burns which he had suffered some days previously when he had exposed himself for a brief period while working with the light.

At the conclusion of the demonstration a rising vote of thanks was accorded the speaker for his kindness. A short general discussion followed, but owing to the lateness of the hour several members were forced away to keep other engagements and the remainder gathered into several small groups for more or less individual questioning and discussion.

Dr. Norris opened the general discussion by asking whether a satisfactory standardizatzion ratio between the lamp and daylight could be obtained and, further, whether there might not be some dyes which would fade when exposed to the ultraviolet light which would not fade readily in sunlight.

Mr. Robinson replied that there were dyestuffs which faded in ultraviolet light faster than the standardization ratio would seem to indicate. The opposite was also true in some cases, certain dyes showing more resistance than would be expected under ultraviolet light. As a basis for establishing a working standardizing ratio, the speaker suggested a comparison of the rates of fading of a characteristic dye from each group of artificial dyes when samples were exposed to sunlight and to ultraviolet light. By comparing the times required to give the same amount of fading, a working ratio might be obtained which could be applied with approximate accuracy to other dyes of the group.

In reply to a question from Mr. Davies asking what he meant by the term group of dyes, the speaker said he referred to the classes or groups given in the classification based on chemical constitution of the dyestuffs.

Prof. Olney asked if the falling off in intensity of the light had been correctly explained, what the loss should be in 200 to 300 hours of use, and, further, if the loss was sudden or gradual. He likewise wanted to know if the loss was greater in a non-cooled lamp.

The lecturer stated in answer that the loss in the first 500 hours was very small, but that after 2,000 hours the

intensity of ultraviolet light was about 50 per cent. The loss was not sudden but gradual, due to an accumulating blackening of the tube. The lamp should be recalibrated from time to time. The property of losing intensity appeared to be common to all kinds of vapor lamps, it occurring in some more than in others.

Prof. Olney mentioned the behavior of a mercury vapor lamp at the Lowell Textile School, which appeared to suffer a decided and rather sudden lowering of activity after perhaps 300 hours, and he wondered if it were due to conditions in the lamp or to some outside influence.

Mr. Robinson mentioned the work of the Bureau of Standards on mercury vapor lamps. In this type of lamps they had found a loss of about 33 per cent in 1,200 to 1,500 hours to be about a normal behavior. The loss could be noted by comparison with a new lamp or with a standard photometer. New burners could be installed in some of the lamps, which would renew their efficiency. The Bureau charged the loss as due to devitrification of the tubes and the formation of mercury silicates, which might be subsequently decomposed if too much voltage were used. With too high a voltage the loss in efficiency might be much more rapid or even sudden.

Prof. Olney stated that the lamp was a 110-volt lamp connected with proper appliances to a 220-volt circuit. He said perhaps at some time an unknown change in these appliances or their adjustment may have admitted too much voltage into the lamp. The lecturer thought that if this might have happened it very likely would have contributed to the speed of lowered efficiency.

In connection with the effect upon the eyes of the ultraviolet light from the lamp, it was asked if a mica screen would protect the eyes. The lamp used by the lecturer was protected by a filter composed of nickel oxide glass. Mr. Robinson said that the only protection needed was glass. Eyeglasses made of glass, not quartz, would amply protect the eyes. He mentioned the possibility of ultraviolet light being reflected up under the glasses, as from a white table cover, in which case the feeling in the eyes would resemble that of conjunctivitis.

Prof. Olney asked how long an exposure would be necessary to injure the eyes. The speaker answered that an exposure of ten seconds to the nacked eye when held close to the lamp was sufficient to burn the eye. The result was a very unpleasant feeling but not in the least permanently dangerous, as it passed off in from twenty-four to forty-eight hours and the eyes would be normal again. Eyeglasses protected the wearer adequately.

Prof. Olney mentioned the fact that long exposure to sunlight altered the affinity of some fibers for dyestuffs. He wanted to know if long exposure to the ultraviolet light altered the properties of the fibers to any extent. The lecturer did not know about this.

Mr. Davies inquired if the same differences in fading power existed in the flaming arc, or was its lighting of uniform value. Mr. Robinson replied that there were always some differences in any artificial light—some were more even than others.

Mr. Robinson stated that the same design of lamp was made with glass tubes in place of quartz. These did good service in noting fluorescence. Many dyes had this property which could be used in determining purity, even 5 per cent of impurity (non-fluorescent dye) being distinguishable. The glass lamp was of much value in connection with absorption spectra determinations, especially of materials in aqueous solution.

Mr. Moran commented on the small size of the light source and wondered if it could be used for several dyed samples at the same time. The speaker said that it could by putting the samples farther away from the lamp (quartz tube). The cost of the quartz lamp was $276.

There was some discussion as to the use of the lamp in testing tertiary shades made up of dyes of different character. Mr. Putnam desired to know if one could predict what the fastness of the shade would be. Mr. Robinson answered that in the case of mixed dyeings actual tests must be made; no direct predictions could be made. In the case of a dye of unknown constitution, tests must be made or information sought from digests on dyestuff composition.

ARTHUR K. JOHNSON, Secretary.

MEETING OF RHODE ISLAND SECTION

The first fall meeting of the Rhode Island Section of the American Society of Textile Chemists and Colorists was held at the Engineers' Club, Providence, R. I., on the evening of Friday, October 20.

The meeting was opened by Chairman William H. Cady, who announced that two new officers—namely, a Chairman and a Secretary—must be elected to replace Messrs. Cady and Cushing, who are leaving the Section due to change in residence.

On a call for nominations for Chairman from the floor, Ralph Culver was nominated by Dr. Strachan and Dr. Robert Lyons was nominated by Mr. Webster. Dr. Lyons immediately withdrew his name from consideration, due to inability to devote the necessary time to the work, and as there were no further nominations, Mr. Culver was elected by a verbal ballot.

Nominations for the office of Secretary were next asked, and Mr. Bamberger was nominated by Mr. Barlow. No other nomiations being made, Mr. Bamberger was duly elected.

The Chairman called attention to the fact that the by-laws of the Section did not prescribe the length of service of elected officers and, moreover, did not define the fiscal year. A discussion and expression of opinion from the floor on this subject was asked.

Mr. Webster stated that he thought the elected officers

should serve one year and that elections should be held at the meeting falling nearest to the end of the fiscal year of the parent society; namely, in December. This opinion was put in the form of a motion of amendment to the by-laws, seconded and passed.

The Chairman suggested that the officers just elected should hold office until the December meeting in 1923, and asked for an expression of opinion from the floor as to the time of election of a Treasurer and Councilors. A motion was made, seconded and passed that the officers just elected should hold office until December, 1923, and that the present Treasurer and Councilors be re-elected for another year, or until the December meeting in 1923.

The complete list of officers for the Rhode Island Section for the year of 1923 is, therefore, as follows: Chairman, Ralph F. Culver; Secretary, Leslie L. Bamberger; Treasurer, Ben Verity. Sectional Committee: John G. Masson, Walter S. Williams, Roscoe L. Chase and H. F. Schwarz.

The chairman read a communication from the Providence Engineering Society outlining a scheme of affiliation to govern the proper use of the Society's rooms for meeting purposes and proposing that the Association appoint a representative to confer with representatives of the various societies which use the building. It was moved that this matter be turned over to the incoming Chairman for action.

At the close of the business meeting the Chairman introduced Frederick J. Hoxie, who gave a very interesting illustrated talk on the "Use of the Microscope in Textile Work," an abstract of which is published elsewhere in this issue. About fifty members were present.

L. L. BAMBERGER, Secretary.

THE USE OF THE MICROSCOPE IN TEXTILE WORK

[*An abstract of a paper presented by Frederick J. Hoxie before the Rhode Island Section on October 20, 1922.*]

Mr. Hoxie stated that in his conversation and work with many textile chemists and managers he had always found great interest in the possibilities of the microscope but very little actual use of the instrument in investigation and research. He has found that most textile chemists occasionally make use of the microscope for the identification of fibers, starches, etc., but very few have made sections or microphotographs of the fibers.

This condition is undoubtedly due to the fact that the technique of microscopy is so intricate and difficult in its present condition that in order to be able to do good work the operator must devote his time to little else. Obviously, this is an impossibility for the busy works chemist. Mr. Hoxie believes that the first great task confronting chemical microscopy in the struggle to justify its existence as a separate branch of science is so to improve its technique that any intelligent person can do good work without first becoming a specialist. For advancement along these lines we must look to the large research laboratories with unlimited equipment and men with the time to spend months, if necessary, on the perfection of some minute detail of manipulation.

Mr. Hoxie showed a large number of slides, with the aid of which he illustrated the various methods of making and photographing cross-sections and the effect of different methods of procedure and schemes of illumination in making microphotographs. The importance of choosing the proper degree of magnification to show to best advantage the particular feature under consideration was emphasized with the aid of actual examples; and a very simple and accurate method of measuring the twist of yarn by the aid of microphotographs was demonstrated. Among the interesting slides exhibited were microphotographs showing examples of injured and defective fibers, as well as cross-sections illustrating the behavior of the cotton fiber with various classes of dyestuffs.

In discussing the cross-sections of dyed fibers Mr. Hoxie pointed out that in none was the dye evenly distributed throughout the fiber, but even in those most thoroughly penetrated hardly more than one-tenth of the entire volume is actually dyed. It is a fact that the more fugitive classes of dyestuffs offer the best penetration, while the extremely fast classes of colors do not penetrate at all but give cross-sections showing the fiber in its original condition with a thin shell of insoluble color on the outside. It is significant that many of the fastest colors, including the vat colors, are applied to the fiber in the reduced condition and fixed by oxidation, and that these colors as a class give probably the poorest penetration. The reason why some colors penetrate the fiber to a certain extent and others practically not at all, offers a very pretty problem, the solving of which, by microscopic methods, in itself would be quite an achievement for a comparatively young science, as well as opening up new methods and lines of thought of great value in developing the technique of microscopy.

Mr. Hoxie has done quite a little work, in which he proved that certain woods when exposed to moisture and light develop a coating of a cellulose peroxide which can be detected by its effect on a sensitive photographic plate and which can be dissolved in alcohol and precipitated intact. It is perfectly possible that the cellulose of cotton may also form such peroxide compounds, although their detection by the means of the photographic plate is practically impossible, due to the small size of the cross-section of the cotton fiber.

The assumption of the presence of a layer of peroxide encasing the fiber satisfactorily explains the non-penetra-

tion of the vat colors, because as soon as the reduced color comes into contact with the peroxides, oxidation takes place, and the formation of a film of oxidized color prevents the reduced dye from penetrating further.

Mr. Hoxie stated that much research work should, and undoubtedly would be done in investigating this interesting theory; and, in conclusion, he called for a discussion of its merits and demerits by some of the members present. An interesting discussion covering various theoretical and practical aspects of the idea followed, in which Mr. Webster, Mr. Watson, Dr. Strachan and others participated.

DISCUSSION OF WASHING STANDARDS ON SILK

The special sub-committee on the fastness of dyed silk to washing, scouring and fulling wish to report the following correspondence with one investigator regarding the grouping of the standards.

Extract from first letter received: "Some of the colors, in my opinion, are not grouped in their proper classes. For instance, Brilliant Green Crystals has been placed in Class 3 along with Victoria Blue B, whereas Formyl Violet S4B, Chrysophenine and Patent Blue A are placed in Class 4. It seems to me that these three classes should be regrouped.

"The Patent Blue A and Formyl Violet S4B can be considered at least as fast as the Victoria Blue B. The Chrysophenine might even be moved up to Class 2, as the Primuline which is given as a standard for Class 2 stains cotton slightly, whereas Chrysophenine does not. I think that the Diamine Fast Blue FFB and Diamine Green B are properly grouped in Class 4, and believe that Brilliant Green Crystals because of the way it bleeds off, resulting in a considerably weaker shade, should be placed in Class 4."

Extract from reply of chairman of sub-committee: "I was very glad to receive your letter and note the interest which you have displayed in the washing report as submitted by Committee to the American Association of Textile Chemists and Colorists.

"I do not agree, however, with some of the deductions in your letter. For instance, Brilliant Green, although it stains the silk slightly at a low temperature, does not suffer any appreciable loss in shade even up to 160 deg. Fahr. On the other hand, Chrysophenine, Patent Blue A and Formyl Violet S4B show quite noticeable staining at 120 deg. Fahr., and a noticeable loss in shade at 160 deg.

"These washing observations are also borne out in the fulling tests which were made by the American Woolen Company, under the direction of Mr. Livermore. Whereas the Brilliant Green stood up very well in fulling, it was noted that Patent Blue A suffered a considerable reduction in shade."

Extract from second letter: "I was very much interested in your comments to my letter of June 15. Your remarks prompted another set of comparative tests which disclose the fact that we are no doubt making our tests with soaps of different alkali content.

"In making the tests on which my statements in my letter of June 14 were based, we used a neutral olive oil soap which we assumed would be comparable with a soap such as Lux or Ivory flakes. However, we find that when either of the latter are used somewhat different results are obtained. We must agree with you that colors such as Chrysophenine, Patent Blue A and Formyl Violet S4B can be grouped in about the same class.

"In the case of the Formyl Violet S4B, we do not find the noticeable staining which you say takes place at a temperature of 120 deg. Fahr.; however, in the case of the Patent Blue A we do find this staining to take place and in the case of the Chrysophenine the stain is even heavier. However, the Formyl Violet S4B loses its shade to about the same extent as in the case of both the Patent Blue A and the Chrysophenine.

"In the grouping of the Brilliant Green Crystals, however, we still cannot agree with you. At 160 deg. Fahr. this color loses its shade to a considerable extent, and in this respect, in my opinion, is not any better than the other three colors."

The above discussion is of especial interest because it demonstrates the important of using identical soap solutions in conducting the washing tests. It develops that a 1 per cent neutral olive oil soap solution has a different action than a 1 per cent solution of Lux or Ivory chips. The reason for this is not so easy to determine. The committee does not believe that it is due to a difference in alkalinity, because an analysis will show that either Lux or Ivory chips are just as neutral as the best olive oil soap.

The actual distinction between the two is that the chips possess a higher soap content because of the relatively small amount of water present, and they have an entirely different fatty acid base. Either one or both of these factors may influence the washing action. The committee chose to designate Lux or Ivory chips because of their uniformity and ease with which they could be obtained.

With reference to the criticism of the standards in Class 3—namely, Victoria Blue B and Brilliant Green Crystals—the committee realize that the latter is not quite as fast to washing or fulling as the former, but believe that it is nearer in this respect to Victoria Blue B than to Patent Blue A or Formy Violet S4B. In other words, each class is supposed to include colors within certain limits of fastness and we believe that Brilliant Green Crystals can be considered within the limits of Class 3. We would welcome any further discussion of this or other questions in connection with the fastness of dyed silk to washing or fulling.

MECHANICAL APPLIANCES FOR PUMPING CHEMICAL SOLUTIONS

(*Continued from page* 344.)

Fig. 29 illustrates a steam jet exhauster assisting the transfer of liquid from a tank car to a storage tank by means of an ordinary syphon pipe. The storage tank must be located below the tank car. The storage tank can be made of cast iron, lead lined or enameled lined, according to the acid to be handled.

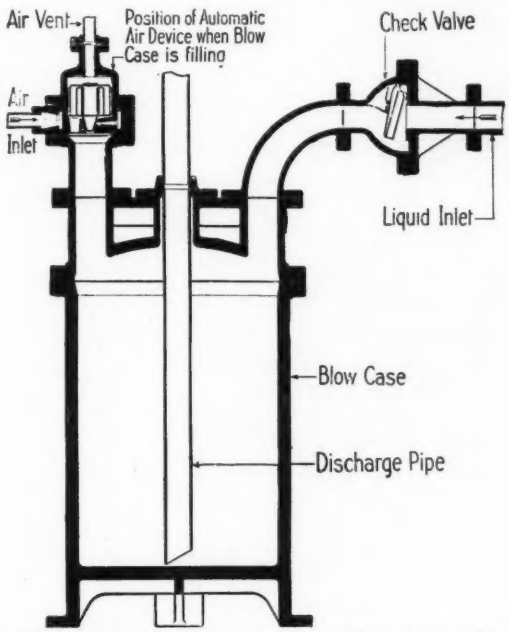

FIG. 31—*A Typical Blowcase, Showing the Position of the Check Valve and the Automatic Air Device When the Blowcase Is Filling*

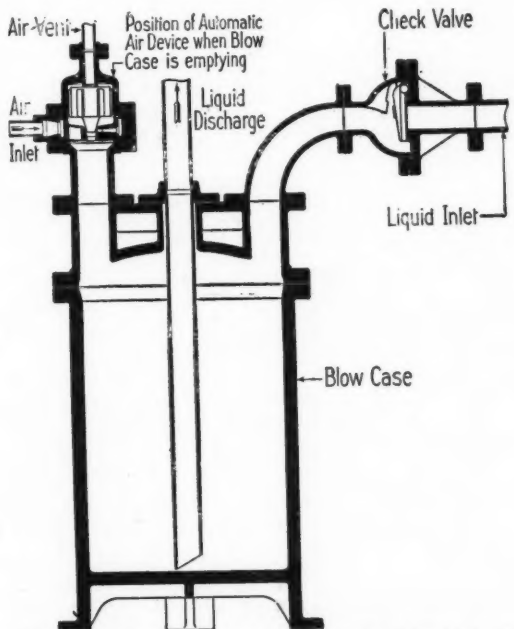

FIG. 32—*The Same Blowcase When the Liquid Is Being Discharged*

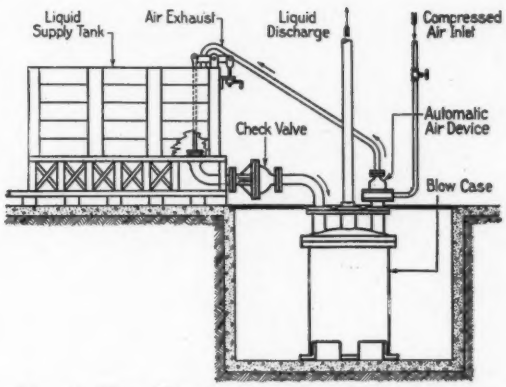

FIG. 33—*A Plan View and a Sectional Elevation of a Typical Automatic Air Device*

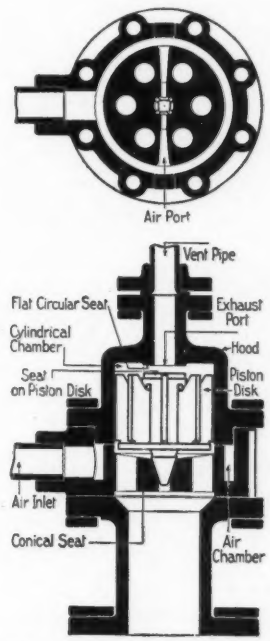

FIG. 34—*Application of the Blowcase, Showing the Liquid Supply Tank, Check Valve, Blowcase, Automatic Air Device, and Liquid and Compressed Air Pipes*

Fig. 30 shows how a liquid can be elevated by means of a combination syphon pipe and air jet lift arrangement to a storage tank at a higher elevation than that of the tank car. The air is first evacuated from the syphon pipe before the syphon pipe is put into operation. This is accomplished by the exhauster. After the flow of the liquid through the syphon pipe has started, the upper stop valve SV and the exhauster E are shut off. The liquid, now lifted by means of the syphon action alone, is passed to the air jet lift and thence elevated to the overhead storage tank.

C—Pneumatic Displacement Pump
(Blowcase, Montejus, Acid Egg)

Pneumatic displacement pumps are known in the chemical industry as blowcases, acid eggs or montejus. They are essentially closed tanks, made of cast iron or stoneware, into which the liquid flows by gravity. The method of operation is simple: Compressed air acts upon the surface of the liquid in the tank and forces the liquid to the required elevation. While the blowcase is being filled the supply of compressed air is shut off and the air pressure in the blowcase is relieved by means of an air relief valve.

Blowcases are operated either by hand or automatically. When hand operation is used, a large container or tank is required in order to limit the number of times the tank is filled and emptied when a given quantity of liquid is pumped.

Modern factories prefer the automatic blowcases, in which the supply of compressed air is controlled by means of an automatic air device.

Figs. 31 and 32 are sectional elevations of a typical

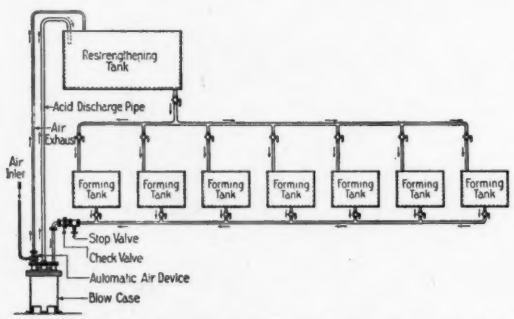

Fig. 35—*The Blowcase Is Extensively Use for Distributing Restrengthening Acids to Forming Tanks in Storage Battery Plant, as Shown Above*

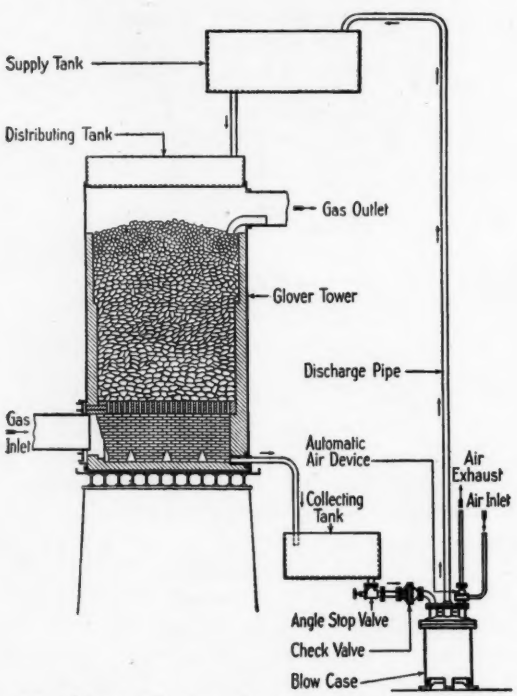

Fig. 36—*Glover Towers Are Frequently Equipped with Blowcases for Raising the Liquids to the Supply Tanks*

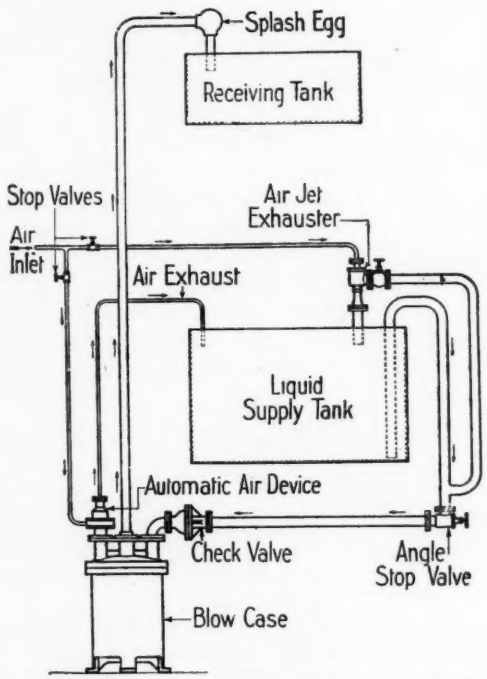

Fig. 37—*Here Liquid Is Raised from a Lower Tank, Known as the Supply Tank, to a Higher or Receiving Tank*

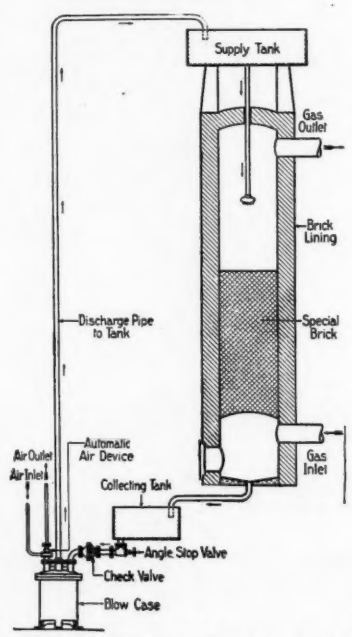

Fig. 38—*A Scrubbing Tower Equipped with a Blowcase*

Modern factories prefer the automatic blowcases, in which the supply of compressed air is controlled by means of an automatic air device.

Figs. 31 and 32 are sectional elevations of a typical

automatic blowcase, and show the positions of the several parts when the case is filling and also when it is emptying. The blowcase illustrated consists of a tank and an automatic air device by means of which the compressed air for operating the blowcase is automatically admitted and cut off at intervals.

A plan and sectional elevation of the automatic air device is shown in *Fig.* 33. The device consists of a valve plate, in the center of which is an opening having a conical valve seat which communicates by means of two radial ports or tunnels (see plan view in *Fig.* 33) to a circular or annular chamber, which in turn connects with the compressed air inlet. A number of vertical cylindrical ports or surge holes are provided around the valve seat.

FIG. 39—*A Typical Blowcase*

FIG. 40—*Another Typical Blowcase*

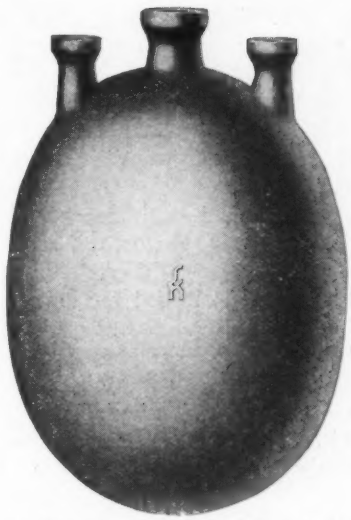

FIG. 41—*A Blowcase Made of Chemical Stoneware*

FIG. 42—*The Same Blowcase Protected by an Armor Sheathing*

To the valve plate or disk is attached a cylindrical chamber in which moves a piston disk which is a cylindrical plunger, to which are attached a number of radial segments that permit the disk to move with a minimum of friction. The bottom of the disk terminates in a wedge or inverted cylindrical cone designed to make a perfect air-tight joint with a conical seat in the plate. The top of the piston disk is provided with a flat circular seat which likewise makes an air-tight joint or contact with the flat circular seat on the exhaust port of the cylindrical chamber.

The operation of the blowcase and automatic air device is readily understood by referring to *Figs.* 31 and 32. The liquid to be pumped flows by gravity from a supply

tank (not shown in *Figs.* 31 and 32) through the check valve into the blowcase, and fills the case until the liquid comes into contact with the bottom of the piston disk. As the liquid raises the piston disk from its seat, the radial ports are uncovered and compressed air admitted into the blowcase. Under these conditions the piston disk is forced tight against the exhaust port, thus preventing escape of compressed air through the vent pipe. The air also causes the check valve to close and forces the liquid through the discharge pipe of the apparatus. As soon as all the liquid has been discharged, the compressed air remaining in the blowcase expands; its pressure is thereby reduced, and the piston disk, no longer held by the compressed air against the vent port, falls and makes contact with the conical seat, shutting off the admission of compressed air. The liquid once again flows into the blowcase and the preceding cycle of operations is repeated.

While the blowcase is filling, the air or gas remaining therein after the previous pumping operation is displaced by the incoming liquid and escapes through the surge holes in the base of the automatic air device, thence upward through the spaces between the radial segments on the piston disk, through the exhaust port and out into the vent pipe.

Typical applications of the blowcase are shown in *Figs.* 34, 35, 36, 37 and 38. External views of the blowcase alone are shown in *Figs.* 39, 40, 41 and 42. The blowcases shown in the last two figures are made of chemical stoneware.

D—Diaphragm Pumps

The diaphragm pump is a chemical pump whereby a diaphragm is interposed between the liquid and a mechanically acting plunger. This pump can only be run at moderate speeds, therefore its capacity is limited. It has, however, one important advantage: there are no stuffing boxes that come in contact with the liquid.

(*To be concluded in the next issue.*)

American-Made Colors

A Classified List of All Dyes of American Manufacture, Giving the Name of the Maker and His Trade Name for Each Product

Group III.—Chrome Colors

In this classification are included alizarines and pseudo-alizarines, which were not classed by themselves because of the difficulty of determining which were actually true alizarines.

BLACK

Chrome Blue Black RX
Butterworth-Judson Corporation

Chrome Black FF
Butterworth-Judson Corporation

Chrome Black T
Butterworth-Judson Corporation

National Alizarol Gray DG
National Aniline & Chemical Co.

National Superchrome Black PV
National Aniline & Chemical Co.

National Buffalo Chrome Black 2BN
National Aniline & Chemical Co.

National Buffalo Chrome Black NS
National Aniline & Chemical Co.

National Buffalo Chrome Black 2BR
National Aniline & Chemical Co.

National Alizarol Black 3G
National Aniline & Chemical Co.

Potachrome Black B
E. I. du Pont de Nemours & Co.

Pontachrome Blue Black R Conc.
E. I. du Pont de Nemours & Co.

Erio Chrome Blue Black B
Cincinnati Chemical Works

Erio Chrome Blue Black R
Cincinnati Chemical Works

Erio Chrome Black T
Cincinnati Chemical Works

Kromeko Blue Black 6B
John Campbell & Co.

Diamond Blue Black RB
Grasselli Chemical Co.

Diamond Blue Black B
Grasselli Chemical Co.

Diamond Black PV
Grasselli Chemical Co.

Diamond Black F
Croton Color & Chemical Co.

Newport Chrome Blue Black VF Conc.
Newport Chemical Works, Inc.

Newport Chrome Blue Black BV Conc.
Newport Chemical Works, Inc.

Fast Steam Black
Hub Dyestuff & Chemical Co.

Fast Steam Gray
Hub Dyestuff & Chemical Co.

Alizarine Black Z2N Paste
Zinsser & Co.

Alizarine Black Powder
Zinsser & Co.

Alizarine Black J Paste
Zinsser & Co.

Chrome Black B
The Sherwin-Williams Co.

Chrome Black
Central Dyestuff & Chemical Co.

BLUE

National Chrome Blue 3RYN
National Aniline & Chemical Co.

National Chrome Blue 3RYN Conc.
National Aniline & Chemical Co.

National Chrome Blue RBN Conc.
National Aniline & Chemical Co.

National Chrome Blue GN Conc.
National Aniline & Chemical Co.

National Chrome Blue GD
National Aniline & Chemical Co.

National Chrome Blue GCB
National Aniline & Chemical Co.

National Serichrome Blue R
National Aniline & Chemical Co.

National Superchrome Blue B Extra
National Aniline & Chemical Co.

National Anthracene Blue N Paste
National Aniline & Chemical Co.

National Alizarine Blue 2RC Paste
National Aniline & Chemical Co.

National Alizarine Sapphire
National Aniline & Chemical Co.

National Alizarine Sapphire FS
National Aniline & Chemical Co.

Alizarine Saphirol B
Grasselli Chemical Co.

Brilliant Alizarine Blue
Grasselli Chemical Co.

Calco Alizarine Blue RBN Extra
Calco Chemical Co.

Alizarine Blue Zinsser
Zinsser & Co.

Alizarine Navy Blue Z2R
Zinsser & Co.

Anthracene Blue WBR (20% Paste)
Beaver Chemical Co., Inc.

Palachrome Blue B Powder
Palatine Aniline & Chemical Corp.

Palaside Blue GS
Palatine Aniline & Chemical Corp.

Palaside Blue SW
Palatine Aniline & Chemical Corp.

Kromeko Fast Blue 4B Conc.
John Campbell & Co.

Gallocyanine
American Aniline Products, Inc.

Delphine Blue B
American Aniline Products, Inc.

Navy Blue G
Hub Dyestuff & Chemical Co.

Navy Blue R
Hub Dyestuff & Chemical Co.

Newport Azo Chrome Blue B
Newport Chemical Works, Inc.

Newport Azo Chrome Blue BR
Newport Chemical Works, Inc.

Newport Acid Chrome Blue G
Newport Chemical Works, Inc.

Newport Chrome Blue G Extra
Newport Chemical Works, Inc.

Newport Chromotrope 2R
Newport Chemical Works, Inc.

Newport Chromotrope 2RN
Newport Chemical Works, Inc.

Newport Chromotrope 2B
Newport Chemical Works, Inc.

Newport Chromotrope 10B
Newport Chemical Works, Inc.

Du Pont Gallocyanine W
E. I. du Pont de Nemours & Co.

Pontachrome Blue R
E. I. du Pont de Nemours & Co.

BROWN

Amanil Chrome Brown G
American Aniline Products, Inc.

Amanil Chrome Brown RR
American Aniline Products, Inc.

Amanil Chrome Dark Brown
American Aniline Products, Inc.

Alizarine Brown WR
Ultro Chemical Corporation

Alizarine Brown 3R
The Sherwin-Williams Co.

Newport Chrome Brown SWR
Newport Chemical Works, Inc.

Newport Chromate Brown BB
Newport Chemical Works, Inc.

Newport Chrome Dark Brown M
Newport Chemical Works, Inc.

Calco Alizarine Brown B Paste
Calco Chemical Co.

Calco Alizarine Brown B Powder
Calco Chemical Co.

Acid Anthracene Brown B
Grasselli Chemical Co.

Acid Anthracene Brown RHSX
Grasselli Chemical Co.

Acid Anthracene Brown VA
Grasselli Chemical Co.

Chrome Brown SW
Butterworth-Judson Corporation

Chrome Brown SW Conc.
Butterworth-Judson Corporation

Kromeko Brown 6G
John Campbell & Co.

Kromeko Brown B Paste
John Campbell & Co.

Kromeko Brown SWY
John Campbell & Co.

Alizarine Brown O
Zinsser & Co.

Alizarine Brown OR
Zinsser & Co.

Alizarine Brown ZWS
Zinsser & Co.

Alizarine Brown ZYS
Zinsser & Co.

Alizarine Brown 5R Extra
Zinsser & Co.

Alizarine Brown SG Paste
Zinsser & Co.

Alizarine Brown GG Paste
Zinsser & Co.

Alizarine Red Brown Paste for Printing
Zinsser & Co.

Anthracene Brown SW
Zinsser & Co.

Du Pont Anthracene Brown Paste
E. I. du Pont de Nemours & Co.

Pontachrome Brown 3G Paste
E. I. du Pont de Nemours & Co.

Pontachrome Brown MW Brands
E. I. du Pont de Nemours & Co.

Pontachrome Brown R
E. I. du Pont de Nemours & Co.

Alizarine Brown R
Hub Dyestuff & Chemical Co.

Alizarine Brown B
Hub Dyestuff & Chemical Co.

National Khaki Brown AC
National Aniline & Chemical Co.

National Khaki Brown CM
National Aniline & Chemical Co.

National Alizarol Brown B
National Aniline & Chemical Co.

National Alizarol Brown 2B
National Aniline & Chemical Co.

National Alizarol Brown RB
National Aniline & Chemical Co.

GREEN

Alizarine Green ZGS
Zinsser & Co.

Alizarine Green ZG
Zinsser & Co.

Newport Chrome Green N
Newport Chemical Works, Inc.

Pontachrome Green GLO
E. I. du Pont de Nemours & Co.

Kromeko Fast Green D
John Campbell & Co.

Kromeko Green SW Extra Conc.
John Campbell & Co.

Autochrome Green BB
John Campbell & Co.

Chrome Green SW
Butterworth-Judson Corporation

National Serichrome Green B
National Aniline & Chemical Co.

National Chrome Green CB
National Aniline & Chemical Co.

Alizarine Green
Grasselli Chemical Co.

Diamond Green 3GA
Grasselli Chemical Co.

Essex Alizarine Green SX
Essex Aniline Works, Inc.

Essex Chrome Green B Conc.
Essex Aniline Works, Inc.

ORANGE

Chrome Orange R
Cincinnati Chemical Works

National Alizarine Orange RP Paste
National Aniline & Chemical Co.

National Alizarol Orange R
National Aniline & Chemical Co.

Palachrome Orange Conc.
Palatine Aniline & Chemical Corp.

Alizarine Orange RN
The Sherwin-Williams Co.

Calco Alizarine Orange R
Calco Chemical Co.

Kromeko Orange
John Campbell & Co.

Alizarine Orange R
American Aniline Products, Inc.

Newport Chrome Orange GG
Newport Chemical Works, Inc.

RED

National Alizarine Y 20% Paste
National Aniline & Chemical Co.

National Alizarine NAC 20% Paste
National Aniline & Chemical Co.

National Superchrome Red B
National Aniline & Chemical Co.

National Superchrome Garnet Y
National Aniline & Chemical Co.

Alizarine Red BC (20% Paste)
Beaver Chemical Co., Inc.

Diamond Red BH Extra
Grasselli Chemical Co.

Palachrome Red 2B Paste
Palatine Aniline & Chemical Corp.

Acid Alizarine Red B
Ultro Chemical Corporation

Newport Acid Chrome Red 3B
Newport Chemical Works, Inc.

Newport Chrome Red A4B
Newport Chemical Works, Inc.

Newport Chrome Bordeaux RW
Newport Chemical Works, Inc.

Kromeko Bordeaux B
John Campbell & Co.

Superchrome Red B
John Campbell & Co.

Acid Anthracene Red G
American Aniline Products, Inc.

Chrome Bordeaux SW
Butterworth-Judson Corporation

VIOLET

Alizarine Violet ZBS
Zinsser & Co.

Alizarine Violet Z4B
Zinsser & Co.

Alizarine Violet 2R Paste
Zinsser & Co.

National Superchrome Violet B
National Aniline & Chemical Co.

National Printing Violet R
National Aniline & Chemical Co.

Chrome Violet SW
Butterworth-Judson Corporation

YELLOW

Alizarine Yellow R
Grasselli Chemical Co.

Alizarine Yellow 2G
Grasselli Chemical Co.

Chrome Yellow SS
Grasselli Chemical Co.

Diamond Flavine G
Grasselli Chemical Co.

Pontachrome Yellow G
E. I. du Pont de Nemours & Co.

Pontachrome Yellow GR Conc.
E. I. du Pont de Nemours & Co.

Pontachrome Yellow SW
E. I. du Pont de Nemours & Co.

Pontachrome Yellow 3R
E. I. du Pont de Nemours & Co.

Chrome Yellow D
Cincinnati Chemical Works

Chrome Yellow G
Cincinnati Chemical Works

Newport Chrome Yellow G
Newport Chemical Works, Inc.

Kromeko Yellow SW
John Campbell & Co.

Kromeko Fast Yellow CGW 250%
John Campbell & Co.

Calco Chrome Yellow G
Calco Chemical Co.

Calco Alizarine Yellow 2G
Calco Chemical Co.

Palachrome Yellow G Conc.
Palatine Aniline & Chemical Corp.

Atlanthrene Yellow BG
Atlantic Dyestuff Co.

Alizarine Yellow 2G
American Aniline Products, Inc.

Chrome Yellow LSW
American Aniline Products, Inc.

Alizarine Yellow R
Jacques Wolf & Co.

Alizarine Yellow GN
Jacques Wolf & Co.

National Alizarol Yellow G
National Aniline & Chemical Co.

National Alizarol Yellow 3G
National Aniline & Chemical Co.

National Superchrome Yellow GN
National Aniline & Chemical Co.

Alizarine Yellow R
Hub Dyestuff & Chemical Co.

Alizarine Yellow G
Hub Dyestuff & Chemical Co.

Alizarine Yellow ZR Paste
Zinsser & Co.

Alizarine Yellow ZBR Paste
Zinsser & Co.

CHARLES H. STONE QUITS TEXTILE ALLIANCE

Owing to the fact that the Textile, Alliance, Inc., has not ordered any Reparation dyes since June of this year, and is now merely liquidating its remaining stocks of these, Charles H. Stone, who for the past year has had charge of the distribution of the Reparation dyes it has brought into this country, terminated his work with this organization on October 31, according to an announcement recently issued.

AMERICAN
DYESTUFF REPORTER

Devoted to the use and application of dyestuffs and the mechanical equipment incidental thereto.

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PROFESSOR OF CHEMISTRY AND DYEING, LOWELL TEXTILE SCHOOL
Advisory Editor

LAURANCE T. CLARK
Managing Editor

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Vol. XI November 6, 1922 No. 10

CHEMICAL EDUCATION

A MOVEMENT has been suggested and, we understand, is actually on foot among A. C. S. members, to appoint in each Congressional district reputable chemists to present chemistry in its true light to their legislators. Senators and Congressmen are to be given personal information, not with reference to party or any past or prospective legislation, but simply to make sure that they are conversant with the work of the chemist, his aims and his relation to the community.

The effort is non-political and has for its primary purpose the establishment of a course of reliable non-partisan and unprejudiced information. As a result of these personal contacts and the confidence thus gained, it is reasonable to suppose that when chemical questions arise and these public men are called upon to express an opinion on a measure, they will instinctively turn for information to the chemists whom they have thus come to know.

The world do move! In the three-year struggle to bring about intelligent action of some sort on the question of dye protection, American chemistry as a whole received a bitter lesson, the burden of which was that even the *role* of chemistry in modern business—let alone its achievements and possibilities—occupied a space in the consciousness of our legislators grievously disproportionate to its actual dimensions.

As the current Journal of Industrial and Engineering Chemistry points out, "During the last few years chemists have been impressed with the incredulity of the average man, who simply cannot believe the things the chemists say are done through the science. Imagine a man who knew nothing of the telephone being told that by speaking into a receiver his voice could be heard three thousand miles away! Very likely he would not believe it, but it could be demonstrated much more easily than some of the facts peculiar to chemistry. We have a complex subject difficult to explain to any non-technical man. Yet we have never failed to convert such a man to chemistry when once he really understood and was given a glimpse of its possibilities."

One of the reasons for this state of affairs lies in the early education of the present generation. Despite the great strides in attendance made by our universities, the majority of average citizens to-day went no further than high school, and many did not even complete their high-school training. Of these, a relatively small proportion not to-day actually specializing in chemistry took one or more years of chemistry, and the complaint made several times before in these pages was that even these, while they emerged with a rudimentary knowledge of inorganic chemistry, simple qualitative analysis, etc., were allowed to get away with no conception whatever of the importance and bulk, so to speak, of this science in daily affairs. And it has been repeatedly demonstrated—we are talking now of those students who do not intend to become chemists—that this understanding is of greater importance than a knowledge of the elements and a few of their symbols. Chemists themselves, and those who understand the role of chemistry we believe, will readily agree that whether a high-school student takes chemistry or not, some way should be found to give him this understanding before he completes his schooling. As matters are to-day, it is easily as important that the average man should understand what chemistry can and does do for him, and when to seek its aid, as it is for him to know economics, history, or even some of the branches of mathematics. And the reason for this is that without this understanding he cannot know his own mind, and hence make intelligent response or instruct his representatives to make an intelligent response, to any important legislative question involving chemistry. Such legislative questions are going to become increasingly frequent and prominent in this country. They must be settled in far shorter periods than was required for the last one, else we shall drop behind the other nations of the world. It is an impossibility to get a public decision on a method of protecting such an enterprise as the coal-tar chemical industry if it is first necessary to explain just what the industry is, and how fundamental and far-reaching it is. Such a thing cannot be grasped in its entirety overnight.

That knowledge should be in the minds of legislators and the public, ready to insure soundness of national sentiment when a question relative thereto arises. Lacking such knowledge, the question will be decided on a basis of party politics, which in the long run would be suicidal.

The man who is to-day ignorant of the role of chemistry is simply incompletely educated, no matter what his early advantages or later achievements may have been, and is therefore incapable of being a helpful citizen. It is to be hoped that the plan outlined above will be carried out with vigor, and that it may be carried even into the realm of education through being extended to the heads of high schools and, in fact, all educators.

A CHANCE TO SAVE THE 1923 CHEMICAL SHOW?

OVER the signature of William Haynes, chairman, the Exposition Committee of the Salesmen's Association of the American Chemical Industry has sent out a circular which we feel should receive wide publicity and thought.

"Two rival chemical show managements," says this letter, "are seeking the support of the industry. This Association is convinced that two chemical shows mean failure for both, and we have appointed a committee which is investigating the rival claims."

As pointed out in these columns before, an attempt to stage two chemical shows does mean failure for both, beyond a doubt, and the fact that the Exposition Committee of this organization is investigating the claims of both would appear to be the first logical step in the direction of doing away with one or the other, or effecting a combination upon which all can agree.

An individual, or even two or three companies acting together, would get practically nowhere in instituting such a move; concerted action would be difficult to secure; most executives cannot take the time necessary to look up both propositions and then make a canvass of the industry at large; and, further, no effectual pressure could be brought to bear, once a decision was arrived at. A case of this kind needs the delegation of authority to a few persons, members of a recognized association, with authority to obtain and transmit the average opinion of all.

"With one big chemical show as a nucleus," continues the letter, "we believe a 'Congress of Chemistry' can be held periodically that will be of tremendous practical benefit to every branch of the industry.

"A Chemical Week can be planned with so great an exposition and so interesting a program and with so many associations and societies meeting in conjunction with it that it would be an event which every man in American chemistry would have to attend and which every newspaper in the country would report.

"Our Exposition Committee is working on these plans, and it wants the help of every forward-looking man.

"Would such a chemical show be worth while?

"What suggestions can you offer for its success?

"How can united support be won to this plan?

"What kind of program would you personally like to see worked out?"

The letter concludes with an invitation to all to write their suggestions to the Committee, at 3 Park Place, New York City, and requests a "prompt reply and co-operation."

In their own interests, we cannot too strongly urge all those who have received this letter, and all who have not but who may be interested, to forward their comment, advice, or criticism to the Committee. It would appear that if there is a chance of saving the 1923 Chemical Show from certain ridicule and failure, it must come from action along such lines as suggested. Only a few weeks ago it looked as though the chemical industry must resign itself to the spectacle of a fearful fiasco to the end that order might be brought from chaos in 1924. Two shows, one of which it was proposed to hold in two buildings a block apart, could not but spell disaster.

Both managements claim to have a number of exhibitors signed up. The only possible way now to effect a reconciliation and possible combination—or at least a new deal all around—is by action through an organization having a strong majority of the industry behind it.

While it has been pretty well decided that the Textile Show and the Silk Show, rather than the Chemical Show, are the logical mediums for dye exhibitors, nevertheless, because of the general effect upon all chemistry, and because of the many memberships held by dye people in the A. C. S. Dye Section, we urge dye manufacturers to interest themselves in this effort, and to give it at least their strong moral support.

CORRECTION

Through an error, the article in the October 23 issue, page 300, by Charles A. Everett of the Lowell Textile School, was headed "The Preparation of Woolens for Red Dyeing." This heading should have been "The Preparation of Woolens for Piece Dyeing," and our apologies to the author are herewith tendered.

CHLORIDES IN WARP SIZING

(*Continued from page* 338.)

often find more than 2 per cent of zinc chlorides in sizing preparations, but the magnesium and calcium chlorides may be present in any amount between 5 and 15 per cent. Calcium chloride is used more often than magnesium chloride and is the least harmful of the three. It is sometimes used in a preparation with magnesium sulphate, in which case there is some magnesium chloride formed from the interaction of the sulphate and chloride.

Another source of magnesium and calcium chlorides is from a gum used in sizing made from starch and the two chlorides just mentioned. This gum does not intermix with the size so easily and there is a possibility of the chlorides getting on the warp in spots of concentrated form. This would cause serious trouble at these spots or pockets.

The damage takes place during the singeing of the cloth in the finishing process, and it may be aggravated by the degree of heat attained in passing the cloth through the flame or over the hot plate at too slow a rate of speed. It may also take place when running the cloth through a hot calender.

The damage may be apparent as the goods are singed, or it may not show the effects until the cloth goes over the stretcher. The fact that in some cases the warp sized with magnesium chloride was destroyed while the filling was left intact goes to prove that such damage does take place. There have also been cases where the amount of

acid liberated was sufficient to destroy both warp and filling.

It has been suggested that the trouble was due to the fact that the chloride was not properly mixed in the size preparations and was placed on the warp in concentrated pockets. But these chlorides are very soluble in water and would be thoroughly mixed in the sizing preparation after it has been boiled as is customary. However, such may be the case where chloride gums have been used, for they are not so easily mixed into the size.

It is true that the presence of chlorides is not detrimental in all sizing, and when properly used they may be very beneficial. It is only where the goods are to be singed and bleached that they are dangerous. They can be used to advantage in sizing when the goods are complete after weaving and no further processing is necessary.

However, where the goods are to be subjected to a singeing and bleaching process, magnesium and zinc chlorides should not be present; and if calcium chloride is used at all, greatest care should be taken.—The Staley Journal.

Dyeing Sweat Pad Goods

Goods Handled in Large Lots—Non-Poisonous Colors Essential—Substantive Colors Best Fitted for This Work—Type of Padding Machine Favored—Manipulation in the Dye Bath and After—Drying and Finishing

By J. WILKINSON

THE dyeing and finishing of cotton drillings to be cut up and made into sweat pads for horses is usually conducted in such large lots that it may be considered as a special line of work, for, not only are the lots themselves large, usually about 40,000 yards or more, but only two colors are used—brown and yellow. This goes to simplify matters in the dyehouse and makes it possible to achieve, quite nearly, the limit of efficient management in their handling and the saving of wastes in both time and materials, and to put into practice many new phases and features of dyehouse possibilities and economies which might not be practicable for the smaller lots and greater variety of colors pertaining to the generally usual run of dyehouse work.

The average sweat pad manufacturer is fully alive to the economical possibilities involved in the dyeing and finishing of large lots of sweat pad goods into one or two colors at one time, and has promptly utilized this knowledge to cut the price of dyeing and finishing these goods to zero; it will be obvious, therefore, that the main thing to be considered in the handling of these goods is economy—they must be done cheaply. There are, however, incidentally, a few other points that must be taken into serious consideration. The shade of color, whether brown or yellow, must be uniform, each and every bale out of a 50 or 100 bale lot must, exactly, match every other bale of the same color in both width and shade. Moreover, all the goods in each bale must match each other in shade, the reason for this is that the goods are mixed and cut up together and any variation in the shade will make a sweat pad of two shades which will spoil its merchantability, the shade dyed to-day must match the shade dyed last week, and the goods dyed to-morrow must match them both.

Then again, any irregularity in the width will not answer; the goods must be so finished that when laid together back to back the selvages will come together. Cut outs or half-moons caused by the clips missing on the tentering machine cause much damage and loss to the cutter and must be avoided.

The goods must be so dyed that when laid out in 40 or 50 thicknesses together on the cutting table they will cut easily and without any excessive dulling or overheating of the cutting knives. The goods must be reasonably fast to sunshine and rain; moreover, the colors must be non-poisonous, sweatproof and must not bleed or rub off.

Fastness to Sunlight and Rain

The strength of the material must not be impaired, and the goods must be finished to within one inch of their gray width and must also be stretched in the direction of their length so as to gain in yardage at least 2½ per cent.

The substantive or "direct" dyeing colors are the most available for dyeing sweat pad goods, and the material should be dyed direct from the bale without any previous wetting out, scouring, or bleaching, and these heavy shades should be dyed in a "short" bath, with the addition of soda and Glauber salt.

Especially heavy goods are more readily and thoroughly penetrated when Turkey red oil or Monopole soap is added to the dye bath.

The concentration of the dye bath is in most cases of importance as regards exhaustion of the dyestuff. As a rule the "shorter" the bath, the deeper the shade obtained with the same amount of dyestuff. It has, however, been found that, in some instances, the bath will be better exhausted if a larger volume of liquor

is used. For light shades it is advisable to use a very dilute dye bath. However, in the present case of brown and yellow we advise the "short," that is, the strong concentrated bath, and I would say here that when dyeing these heavy concentrated colors the dyeing box should be fitted with a closed steam coil.

Ordinarily the machines available in the average up-to-date dyeing plant, suitable for dyeing sweat pad goods, are the padding machine and the jigger. Of these the padding machine only may be considered—the jigger being out of the question. The padding machine requires less time and labor to dye the goods than the jigger does; it also takes less dyestuff and the

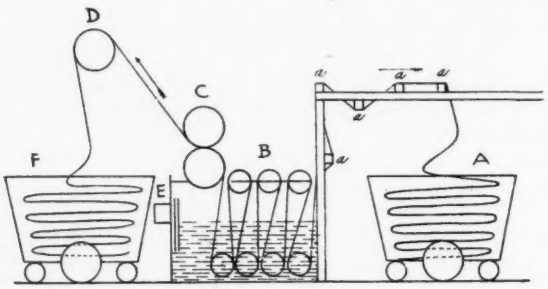

FIG 1

resulting color is more uniform. It is essential, however, that the dyes must be made more freely soluble, so as to penetrate at once into the heart of the fabric, for it must be remembered that the goods are a much shorter time in contact with the dye liquor in a padder than they are in a jigger.

Turkey red oil, Monopole soap, or Marseilles soap are frequently added to the dye bath for the purpose of more readily wetting out the goods.

The dyestuffs should be dissolved in soft water, or, better still, in condensed water. Hard water should be boiled up with some soda before the dyestuff is added. The practice of adding the dyestuff direct to the bath is not to be recommended. If it is done, however, the soda should be added first, then the dyestuff and finally the Glauber salt.

Action of Salts

Neutral salts, such as common salt and Glauber salt, are added for the purpose of accelerating the dyeing. They do this by reducing the affinity of the color molecules for the water by which the color is precipitated on the cloth owing to its superior attraction for them; in other words, when a soluble substantive color is dissolved in water, the color molecules are in equilibrio, and if cotton cloth be passed through this solution, it is stained—not dyed—the same color as the solution only, because it has only the same affinity for the color that the water has. If we now add common salt or Glauber salt to the solution the affinity of the water for the color molecule is so far lessened that it leaves the solution and combines with the cloth.

On the other hand, an addition of soda, soap, Turkey red oil, or sodium phosphate, acts as a retarding influence, and consequently tends to assist in producing more level dyeings. The cotton is usually dyed at the boil. Light shades may be dyed at a lower temperature, about 120 to 140 deg. Fahr. The fastest shades are, however, obtained when the dyeing is conducted at the boil.

The amount of salt or Glauber salt added to the dye bath varies very considerably, but if the bath is to be used continuously as in our present case, the greatest care has to be taken to adjust the addition in such a manner that the dyestuff is not precipitated (salted out).

It will often be found better to add a much larger quantity of dyestuff to the first bath and to add a very small amount of Glauber salt. For the dyeing of subsequent lots the amount of Glauber salt contained in the dyestuff is frequently sufficient to make any addition of Glauber salt unnecessary. When working in this manner, the baths may be used for months without the danger of precipitated dyestuff becoming settled on the goods.

Glauber Salt Not Used for Fancy Shades

Where light and fancy shades, other than the browns and yellows which we are discussing, are required, Glauber salt should not be added. The addition of 1 or 2 per cent of Turkey red oil and 3 to 10 per cent of sodium phosphate will give the best results. Monopole soap is now frequently employed in place of Turkey red oil.

If a more strongly alkaline bath is required, 1 to 2 per cent of soda ash may be added; 5 to 10 per cent of Glauber salt may be added in place of the sodium phosphate, but the results are not as satisfactory as those obtained with the latter.

Medium shades, when required, should be dyed with the addition of 2 per cent soda ash and 10 per cent calcined Glauber salt or its equivalent of crystallized Glauber salt. For the heavy shades such as we are discussing the quantities are given below.

In order to check the amount of Glauber salt present in the dye bath, the specific gravity ought to be ascertained from time to time. When dyeing light shades it should not exceed 2 deg. Tw., while for dark shades it should not exceed 4½ to 6 deg. Tw., at 60 deg. Fahr.

Shades like those used for sweat pads may be dyed in a single passage through a specially geared up padding machine and tenter, as will be shown later on. In this case it is advisable to add a small quantity of a dextrine or apparatine solution (one-half to one pound to each ten gallons of padding liquor) or tragacanth thickening will answer.

Type of Padding Machine Favored

The padding machine upon which we propose to

dye our sweat pads is shown in *Fig.* 1. The goods, 1,500 yards of thirty-seven inch drill (unbleached) are sewed together end to end on the truck A. They then pass over the tension bars, a, a, a, a, and through the liquor in the dyebox B; upon leaving the dye liquor they are squeezed almost dry by the squeeze rolls C, which should travel at a surface velocity of fifty-six yards per minute. They then pass over the reel D or over a folder and are plaited down into the truck F. The dyebox B is fitted with a feed box E, and it is by way of this feed box that all of the addition of dye-

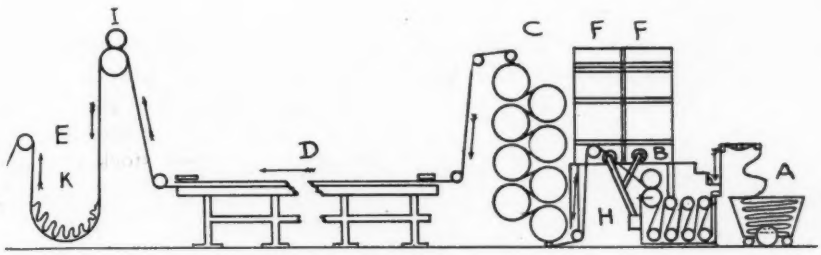

FIG. 2

stuffs to the liquor should be made. The squeeze rolls C should be twelve inches in diameter and the lower roll may be iron and the upper roll of iron covered with rubber.

These rolls should have three-inch shafts through them to enable them to withstand a heavy set or pressure, for it must be borne in mind that we wish not only to squeeze the dye liquor out of the goods, but also to squeeze them so dry as to avoid the time and expense of any subsequent handling or mangling before drying. The tension rails, a, a, a, a, must be three inches square, of sound, hard wood, and the immersion rolls in the dye box must be made of three and one-half or four inch boiler tubing with cast iron heads shrunk in from four to six inches at each end; each head to carry a bearing of one inch steel made to fit and run in suitable grooves or sockets on the insides of the dyebox. These immersion rolls must be balanced and fitted so as to turn easily. All this strength of construction is absolutely necessary because we have to stretch these goods 2½ per cent, and to do this successfully they must be held tight at every point where tension is possible.

Only Two Operations Before Drying

Unlike goods that have been through numberless operations under tension in the bleachhouse, mangles, etc., the sweat pad goods go through only two operations before drying, and therefore the stretching has got to be by heroic measures.

In starting a new dyebox, run into it exactly fifty gallons of water and then bore a one and one-fourth inch hole in the center of it at both the back and front ends and exactly at or above the water line. The hole at the back or exit end is where the feed box F goes on and the hole at the front is for the overflow. Inside the dyebox and at the same end as the feedbox is partitioned off a space about two inches wide as shown in *Fig.* 1. This partition goes quite across the dye box from side to side and half-way or more below the level of the liquor in the box. This is done so that the fresh feed when run into the box will enter it well below the surface of the liquor and thus become thoroughly mixed with the liquor in the box before it comes in contact with the goods.

The dyebox must be fitted with a two-inch water pipe and a one and one-quarter inch steam pipe, these large sized pipes being used to enable us to fill the box and boil it quickly—small pipes for steam or water in a bleachery or dye works are a very expensive economy.

Operation of Padding Machine

Having now described the machine in detail, we may proceed to explain its operations for dyeing sweat pad drills.

To dye the brown shade we fill the dyebox up to the level of the feedbox and outlet holes with water and bring it to a boil. When it boils put a plug into the outlet hole, as we do not intend to run any dyestuff away in these operations. It must all go on the goods. Having plugged the outlet, put the following dyestuffs into the machine box and boil it up very well:

2 pounds Diphenyl Brown.
1 pound Chicago Brown.
5 pounds soap.
10 pounds Glauber salt.
2 poils of apparatine.

Keep this boiling and run 1,500 yards of goods through it. After running it once through, take the truck back to the front of the machine and run it the second time, and it is finished.

Care must be taken, however, to fill the dyebox with water to the level of the feed and outlet holes before commencing the second run. For this second and all subsequent runs, add the following dyestuffs to the old liquor at the end of each run:

30 ounces Diphenyl Brown.
12 ounces Chicago Brown.
2 ounces soap.
10 ounces Glauber salt.
2 pails of apparatine.

All subsequent lots of 1,500 yards are dyed by adding these latter quantities of dyestuffs to the same old liquor at the end of each lot and running twice at a spring boil. The first quantities given are always used to start the machine at the beginning of a large lot (say 100 bales or more) and the second quantities, with enough water to fill the box to plug hole—i. e., outlet—are added to the end of each bale after the first run of the first bale. To start the machine for the yellow color use:

2 pounds Diphenyl Yellow.
5 pounds soap.
10 pounds Glauber salt.
2 pails of apparatine.

Give two runs and for second end of first truck (1,500 yards) and for each end of all subsequent trucks add to the old liquor:

1½ pounds Diphenyl Yellow.
3 pounds soap.
10 pounds Glauber salt.
2 pails of apparatine.

One hundred bales or more of either brown or yellow can be run in this way without changing or running off any liquor; and with quick operatives and sharp oversight a machine like the one shown in *Fig.* 1 will dye (giving two runs) 15,000 yards daily, but there must be no stoppage. The various stuffs used must be separately dissolved in standardized stock tanks in such a way that a twelve quart bucketful of the solution (or a multiple of this) will contain just the amount required; for example, each bucketful of the yellow dye must hold one and one-half pounds of Diphenyl Yellow in solution; each bucketful of the soap solution must hold three pounds of soap in solution and each bucketful of the Glauber salt in solution should carry the required percentage of Glauber salt. Therefore, assuming that ordinary oil barrels, which contain sixteen bucketfuls, or about forty-eight gallons, are to be used for stock tubs for dissolving the various dyestuffs, the yellow tub must be made up with twenty-four pounds Diphenyl Yellow; the soap tub must be made up with forty-eight pounds of soap, and the Glauber salt tub 160 pounds of Glauber salt. It will be seen, therefore, that after starting the bath in the dyebox with the dry materials as given and boiling them up to thoroughly dissolve them, we shall add to every run afterward one bucket of yellow liquor one bucket of soap liquor, and one bucket of Glauber salt solution from the various stock tubs. It is needless to say that these instructions apply to the brown color or in fact to all colors and all descriptions of goods whether for sweat pads or not.

Adding Dry Dyestuffs Wasteful

Many dyers add the dry dyestuffs directly to the bath in the machine, but this is wasteful of both time and material as the machine has to stand idle while the stuff is being dissolved and the solution is specky and imperfect in other ways. Also always remember that unless the water is soft two pounds of soda ash must be added to both the dye and the soap stock tubs.

Fill the feedbox E with hay or coarse gunny sacking to act as a filter and pour all the feed, except the apparatine, through it into the dyebox. Keep the stuffs in the various stock tanks hot, and keep the liquor in the machine boiling. In this way the feed can be added in a very few moments and the dyeing can go right on without any waits or delays. The apparatine being of a sticky, viscous nature will not pass through the filtering material so easily as the other materials and may, therefore, be added directly into the liquor in the machine. The same methods may, of course, be applied to the browns and also most of the other direct colors.

Apparatine may be prepared by adding to fifty gallons of water eighty pounds of corn starch. When this is thoroughly mixed in cold water and free from all lumps, add to it, with constant stirring, forty pounds of caustic soda at 25 deg. Be. The caustic must be added slowly, and it is well to have an iron tank with a mechanical agitator. After a little while the mixture becomes clear and forms a strong jelly which will keep on getting thicker as it is stirred, until after about two hours the conversion is complete. The object of adding this apparatine to the dye bath is to size the goods slightly so as to prevent the raw edges from fraying when cut at the pad factory and also to assist in conveying the color to the goods in the dye bath. It assists penetration by increasing the catalytic action between the color and the fiber and is the only sizing material that can be depended on to stand the constant boiling of the liquor in the dyeing machine; moreover, it forms a size in the tissue that neither water nor weather will take off after it is once dried on. Glue size might be used, but it would be apt to induce mildew, while apparatine will not promote it in the smallest degree

Drying and Finishing

After dyeing on the padder as described the goods must go to the cylinder drying machine and be thoroughly dried, for if they are not dried evenly they will vary in the shade; they must be also held tense to stretch them in length, not forgetting the 2½ per cent

gain required. If these goods are 37-inch drills, they will, after drying, have shrunk to about 34½ inches in width. To bring them back to 36 inches, the required finished width, they must be tentered on a 20-foot tenter. To do this without tearing the dry goods out at the selvages, and also to make them hold out their width after they leave the clips of the tenter, they must be dampened in some way. A humidifier over the tenter spraying water on the cloth as it travels through, or a steam jet blowing through the cloth from underneath, will answer.

Care must also be taken to hold the cloth tight as it enters the tenter or all previous gain in length will be lost; it must be pulled hard lengthwise as well as stretched laterally to 36 inches.

A continuous system of dyeing and finishing these goods at one run has been devised which works as follows:

A and B, *Fig.* 2, are the same truck and dyebox shown in *Fig.* 1. H is the feedbox and F F the stock tanks for dissolving the dyestuffs ready for the dyebox. C is a vertical dryer of eight cylinders, and D is a sixty-foot tentering machine—shown broken in the cut to save space. E is the measuring machine or "hooker."

The mechanical part of the process is carried out as follows: The gray goods are run from the truck A through the dyeing machine V at a surface speed of fifty-four yards per minute; they pass over the reel as in *Fig.* 1, but instead of being run into a truck they are carried over the necessary tension rolls, as indicated by the arrows, and directly over the eight thirty-inch drying cylinders C where they are partly dried. They pass from these directly onto the tenter D, where they are thoroughly dried and stretched to the desired width, and then pass through the draw rolls I and drop about ten to twenty yards of slack into the metallic half-moon or scoop at K, and over the draw roll at E directly into the jaws of the yarding machine, where they are folded into one-yard folds and measured.

It will be seen that the operation from the gray goods in the truck A to the finished and folded goods at E is a continuous one, with one handling only, but that it requires carefulness and skill of no mean order. The various machines must be geared together so as to travel at the same surface velocity nearly. To get the necessary tension to stretch the goods the required 2½ per cent in length, the dry cans C must travel slightly faster than the dyebox B, and the tenter D must travel slightly faster than the cylinders C, while the folder E must go just enough faster than the tenter D to take up the twenty yards of slack that have run into the half-moon while the folder was stopped to remove the folded and measured piece of goods.

This machine must run continuously; it must not be stopped; every stoppage will dye the goods standing in the dyebox many shades darker than the rest, and the cloth in contact with the drying cylinders will be dried so hard and dry that it will tear when stretched on the tenter. It is also of the first importance that the speed of this machine be fairly constant. There must be no great variation in the speed or the shade will be uneven.

This combination of machinery will dye 30,000 yards daily. It is self-evident that the dyeing, or rather the method of feeding the dyestuff to the goods, must be differently managed than for the two-run process described in connection with *Fig.* 1; therefore, in this case, we shall proceed as follows:

For browns the dyebox must be started with the same dyestuffs and water and in precisely the same manner as described for *Fig.* 1, then make up the stock tubs, F, F, with the following dyestuffs and drugs for each fifty gallons:

2½ pounds Diphenyl Brown.
1¼ pounds Chicago Brown.
10 pounds Glauber salt.
2 pails of apparatine.

While the goods are being run through the liquor in the dyebox, the feed from the stock tubs F, F, must be kept constantly running through suitable pipes into the feedbox H in such a volume as to keep the dyebox full of liquor to the level of the feed and outlet holes; plug the outlet hole to prevent any possible waste as no dye liquor can run away. It is calculated that the contents of one stock tub of fifty gallons will dye 1,500 yards. When one stock tub becomes empty fill it again, while using from the other so that there will be no delay or stoppages.

To dye the yellow continuously start the dye bath in the machine exactly as described for the yellow dye for *Fig.* 1, then make up the stock tubs as follows:

3 pounds Diphenyl Yellow.
5 pounds soap.
10 pounds Glauber salt.
2 pails of apparatine.
50 gallons altogether.

Feed the same as for brown. Dextrin may be used in place of apparatine. Many other shades of direct dyes can be dyed in this same manner and any style of cotton goods, but it is only applicable to large lots of one shade.—Cotton.

SPILLED MILK

Far-sighted men generally have decried the willingness of many corporations to separate from their service trained scientists with years of experience in their specialty at the first indications of the passing of soft times. It is interesting to note now that some of these corporations, finding business improving, seek to rebuild a scientific staff. They find their former specialists employed elsewhere and themselves with such a reputation as a result of their recent action that the men whom they would like find nothing attractive in their offers. We trust the lesson will be well remembered in the future.—Journal of Industrial and Engineering Chemistry.

FORMULA FOR APPRAISING DYE VALUES ISSUED BY TREASURY DEPARTMENT

The formula to be used by appraising officers in ascertaining the United States value of dyes and other coal-tar products has been made public by the Treasury Department.

An order signed by Assistant Secretary of the Treasury Edward Clifford gives the appraising officers instructions as to how to deduct allowances for importers' profits, general expenses, transportation and duties which are to be subtracted from the American wholesale selling price of "such or similar merchandise" in obtaining the value to be used in levying duties under the new tariff act.

The order applies to Sections 27 and 28 dealing with coal-tar products on which duties are to be assessed on the American valuation basis.

The formula was worked out following conferences held at New York with importing interests.

The order provides for an allowance of 8 per cent for profit, 8 per cent for general expenses, besides the cost of transportation, insurance and other expenses from the place of shipment to the United States and the amount of duty paid on the similar imported merchandise.

The full text of the order follows:

"Attention is invited to the definition in Title IV, Section 402, subdivision (d), Tariff Act of 1922, of the term 'the United States value of imported merchandise.'

"Certain questions having arisen in connection with the application of this definition to imports classifiable under paragraphs 27 and 28 of Title II of the act, the department offers the following concrete example as best illustrating its views on the procedure and computations necessary in arriving at the United States value of such merchandise:

"Assume that certain dyes classifiable under paragraph 28 were exported from Germany on September 15, 1922, and imported at New York on October 1, 1922; and that the 'such or similar imported merchandise,' which subdivision (d), Section 402, Title IV, contemplates shall be taken as the standard of comparison, was selling at New York on September 15, 1922, in the usual wholesale quantities, etc., at $1.45 per pound. This price includes the various items for which subdivision (d) provides that allowance shall be made. Assume a maximum allowance of 8 per cent for profit, dividing $1.45 by 1.08 gives $1.34, and subtracting this from $1.45 leaves 11 cents as the amount of the profit included in the $1.45. Assume a maximum allowance of 8 per cent for general expenses, dividing $1.34 by 1.08 gives $1.24, and subtracting this from $1.34 leaves 10 cents as the amount of the general expenses, included in the $1.45. Assume that the cost of transportation, insurance and other necessary expenses from the place of shipment in Germany to New York was 3 cents, and deducting this from $1.24 leaves $1.21, which includes the dutiable value and the duty. Assume that such merchandise was an article which on September 15 was dutiable under Section 500 of the Act of September 8, 1916, at 30 per cent ad valorem. Dividing $1.21 by 1.30 gives $0.93 as the value upon which duty was assessed, and which is the United States value of the merchandise imported on October 1 and subject to the 60 per cent ad valorem rate provided for in the proviso of paragraph 28.

"The amount to be deducted as duty in each case will be governed by the amount of duty actually paid on the article used as the basis for computation.

"The foregoing applies to purchased goods. In the case of consigned goods the appraiser will ascertain the amount of commission paid or contracted to be paid and allow not to exceed 6 per cent of the gross selling prices, in lieu of the 8 per cent profit and 8 per cent general expense. The transportation costs and duty will be ascertained in the same manner as on manufactured goods.

"Appraising officers will ascertain in the usual way, through the special agency service or otherwise, as provided by law and regulations, the facts necessary to be used in such computations."

SILK INDUSTRY APPOINTS STANDARDIZATION AND RESEARCH COMMITTEE

One of the results of the recent Textile Research Conference in Washington, when the Bureau of Standards called in consultation the representatives of textile trade associations, was the adoption of a plan to include the appointment of special standardization and research committees in each of the industries represented. As a step toward the carrying out of this plan, the Executive Committee of the Silk Association of America, according to its official announcement, has appointed a committee to represent the silk industry in co-operation with the Bureau of Standards of the Department of Commerce. The committee appointed is composed of Dr. W. F. Edwards, acting general manager of the United States Testing Company, Inc.; C. Walter Lotte, of the National Silk Dyeing Company; George A. Post, of the Post & Sheldon Corporation; E. C. Rossmassler, of the Sauquoit Silk Manufacturing Company; A. D. Walker, of A. D. Walker & Co., and Frank G. Barry, secretary of the Silk Association of America.

GERMAN CARTEL DOUBLES CAPITAL

The German dye cartel has again doubled its capital stock, issuing about 6,000,000,000 marks of new stock. The new issue has been acquired by a consortium of German banks, which has also taken over all the junior stock of the Badische Anilin and Sodafabrik (worth about 40,000,000 marks, at 650 per cent above par), which was issued for the purpose of reconstructing the Oppau factories blown up last year. Chemical stocks jumped more than 1,000 per cent following the announcement of the capital stock increases. The rise was also attributed partly to individual purchases of German dye stocks by Americans in the belief that the new American tariff was not unfavorable to the German dye industry.

No Change in Status of Italian Dye Industry

Embargo Remains in Force—Italian Manufacturers Import Intermediates—Demand for Colors Increases as Winter Draws Near—Industry Still Hampered by Coal Shortage

By RAFFAELE SANSONE

Genoa, October 10.
Special to The Reporter.

NO decision as to the case of the Italian dye industry was reached during the past six weeks, and the import prohibition remained in force. This permitted the production of certain colors by the Italian factories—colors for which some of the intermediates had to be imported, often from works in south Germany. A continuation of the pronounced fall in the value of the Italian lira brought the United States dollar from 23 lire to 24 lire and even higher in the English pound sterling from 103 lire to 104 lire.

The Demand for Colors

A scarcity of coal for individual use continued and this necessitated the substitution in many cases of electricity, natural gas, water power and lignite for industrial purposes. In the reduction processes based on the use of coal dust, charcoal dust was substituted in some cases with a certain degree of success.

The approach of the winter season, which in Italy is the most active period of the whole year, brought about a noticeable increase in the demand for wool colors (Naphthylamine Blacks, Navy Blues, Acid Greens, Ponceaux, Acid Scarlets, the Indulines, Tartrazines, Fast Acid Browns, etc.), for cotton colors (Sulphur Blacks, Direct Blacks, Benzopurpurines, Fast Direct Scarlets, Chrysophenine G, Direct Cathechines, Primuline, Direct Violet, Direct Greens, etc.) and for silk colors (Naphthol Blacks, Quinoline Yellows, Acid Fuchsines, Orcellines, Victoria Blues, Violamine, Nigrosines, Flavazine, Azoflavine, Brilliant Croceine, Amido Naphthol Blacks, etc.). Many of these products could not be obtained from the stock of war reparation products and had to be imported.

Prices of Coal Tar Dyes

The quotations of war reparation dyes in Table I per ton in lire and dollars show the difference in dollar and lira prices at the moment of writing, in comparison with prices prevailing September 10.

TABLE I

	September 10		October 10	
	(Lire)	(Dollars)	(Lire)	(Dollars)
Naphthol Yellow	40,000-65,000	1,738-2,826	40,000-65,000	1,666-2,708
Auramine	60,000-70,000	2,608-3,043	60,000-70,000	2,500-2,916
Orange II	22,000-25,000	956-1,086	22,000-25,000	916-1,041
Nigrosine, water soluble	28,000-35,000	1,217-1,521	28,000-35,000	1,166-1,458
Nigrosine, soluble in alcohol	30,000-38,000	1,304-1,652	30,000-38,000	1,250-1,582
Sulphur Black	7,000- 9,500	304- 413	7,000- 9,500	291- 395
Acid Black	30,500-34,500	1,326-1,500	30,500-34,500	1,260-1,437
Direct Black	30,500-34,500	1,326-1,500	30,500-35,000	1,260-1,458
Chrome Black	34,000-37,000	1,478-1,608	34,000-37,000	1,416-1,541
Methylene Blue	75,000-90,000	3,260-3,913	75,000-90,000	3,125-3,750
Direct Blue	24,500-28,000	1,065-1,217	24,500-28,000	1,020-1,166
Sulphur Blue	33,500-37,500	1,456-1,630	33,500-37,500	1,395-1,562
Malachite Green	75,000-90,000	3,260-3,913	75,000-90,000	3,125-3,750
Acid Green	60,000-70,000	2,608-3,043	60,000-70,000	2,500-2,916
Direct Green	41,500-54,000	1,804-2,347	42,000-54,500	1,750-2,270
Bismarck Brown	35,000-41,500	1,521-1,804	35,000-41,500	1,458-1,729
Magenta (Fuchsine) Crystals	70,000-80,000	3,043-3,478	70,000-80,000	2,916-3,333
Eosine	50,000-75,000	2,173-3,260	50,000-75,000	2,083-3,125
Ponceaux	28,500-32,500	1,239-1,413	28,500-32,500	1,187-1,354
Methyl Violet	65,000-80,000	2,826-3,478	65,000-80,000	2,708-3,333

TABLE II

	September 9		October 9	
	(Lire)	(Dollars)	(Lire)	(Dollars)
Acetate of alumina	1,600	69	1,600	66
Chrome alum	3,000	130	3,000	125
Bichromate of potash	5,700	247	5,700	237
Ferrous sulphate	500	21	500	20
Copper sulphate	2,100	91	2,100	87
Tartaric emetic	12,000	521	12,000	500
Aniline oil	10,000	434	10,000	416
White refined glycerine	8,500	369	9,000	375
Glucose, 45 deg. Be	3,900	169	3,900	162
Hydrogen peroxide	2,100	91	2,100	87
Tannic acid, 60 per cent	20,000	868	20,000	832
Tartaric acid, crystals	11,500	500	12,000	500
Acetic acid, 30 per cent	2,800	121	2,220	92
Hydrochloric acid, 20-21 deg. Be	300	13	300	12
Formic acid	11,000	478	11,000	458
Lactic acid, 80 per cent	4,000	173	4,000	166
Alum	1,000	43	1,000	41
Ammonia, 22 deg. Be	1,450	63	1,450	60
Bisulphite of soda, 32 deg. Be	380	16	380	15
Chlorate of potash	3,200	139	3,200	133
Chloride of ammonia	5,000	217	4,500	187
Bleaching powder	900	39	900	37
Nitrite of soda	3,000	130	3,000	125
Yellow prussiate of potash	13,000	565	20,000	832
Yellow prussiate of soda	9,000	391	12,000	500
Caustic soda, 70/72	2,000	86	2,000	82
Silicate of soda, 140 deg. Tw	1,000	43	1,000	41
Sodium sulphide	2,600	113	2,200	91
Logwood extract	7,000	304	7,000	291
Yellow dextrine	3,100	134	3,900	162
White dextrine	3,400	147	3,900	162
Farina	3,300	143	3,000	125
Kordofan gum	7,200	313	7,000	300
Indigo, 25 per cent	22,000	957	22,000	916
Beta-naphthol	18,000	782	18,000	750
Industrial castor oil	5,700	247	6,000	250

Mordants, Assistants, Dyehouse Products

Because of recent decisions and rulings, the 50 per cent acetic acid used for dyeing acid colors in the dyehouse and preparing certain color pastes in the print works will in future be adulterated either with thirty parts of aniline oil, ten parts of benzol and ten parts of residues from the rectification of acetic acid or of ten parts benzol and five parts petroleum—in both cases per thousand parts of the acid. Weaker acetic acids, with the exception of pyroligneous acid, will be adulterated with ten parts of benzol and ten parts of residues from the rectification of acetic acid, or of ten parts of benzol and two and a half parts of petroleum.

As usual, the Italian market was monopolized by products coming from such countries as Germany, Czecho Slovakia, Austria and France. Producers in these countries, because of their cheaper production methods, were able to offer their products even lower, in some cases, than they could be produced in Italy itself. Some of the lira and dollar quotations are given, per ton at Milan, in Table II.

Private Dyestuff Quotations

Some private quotations for dyestuffs at Genoa, per kilo, were as follows Nigrosine Crystals, 26 lire to 30 lire; Chrome Black, powder, 34 lire to 36 lire; Acid Black, 32 lire to 35 lire; Direct Black, 32 lire to 35 lire; Direct Green, 48 lire to 54 lire; Logwood Extract, 7 lire to 7.50 lire.

Ten thousand dollars' worth of crepe silk went up in smoke in Paterson, N. J., on October 31 when a truck carrying the goods, belonging to the United Piece Dye Works, caught fire.

FRENCH INCREASE OUTPUT OF DYES

Rumor of Combination of French and German Concerns Is Denied

Some enlightening facts concerning the European dye industry are given in the Paris letter of the October Journal of Industrial and Engineering Chemistry, written by Charles Lormand.

"The syndicate of dyestuff consumers has taken the initiative in asking for customs regulations to protect this industry, but limiting this protection to dyes made in France," says the writer. The dyestuffs not yet made in French factories would be almost entirely free from duty.

"This measure seems to be rather tardy, for the production of dyes in France is increasing daily. The French importation of dyes before the war reached 95 per cent of the national consumption. In 1920 the amount of imports was not more than 60 per cent; in 1921 and at the beginning of 1922 it decreased to 20 per cent. In 1920 50 per cent of the amount imported came from Germany (3,000 out of 6,000 tons); in 1921 the importation was only 400 tons, coming from Germany.

"This decrease of importation is due largely to the efforts of the National Company of Dyestuffs & Chemical Products. The rumor concerning the union of this company with the German companies has been, and is still contradicted. Nevertheless, the dye company has bought a number of patents from the foreigners. It certainly does not wish to lose time in perfecting the manufacture of intermediate products; it has resolutely acquired all the manufacturing processes that it has been able to find concerning these products.

"The procedure of selling dyestuffs by chemical engineers specializing in dyestuffs is being developed in France. This method of selling the manufactured products has been successful; it gives satisfaction to weavers and dyers by permitting collaboration with technical color chemists. These technicians have themselves made the chemicals in special laboratories where the uses of coloring materials are studied.

"The decline of the German mark has made possible at the Stassfurt mines a large exportation of their potash, and just as the Dyestuffs company has had to form an alliance with the German societies, the companies mining Alsatian potash have had to seek an alliance with the German producers. Preliminary arrangements have been under way since May. They have been difficult to bring about, but they seem now to be nearly completed.

"The impossibility of bringing about payment by Germany is going to cause more and more French industries to seek special alliances with industries on the other side of the Rhine. It is well understood that these alliances are purely economic and not political, and that they leave to the French industry all complete freedom of action.

"The English society, British Dyestuffs Corporation, has in the last few years undergone great financial difficulties. The factories which it has erected, constructed hastily, perhaps with insufficient technical preparation, have not been able to furnish the same quality of dyestuffs as those furnished by the German or Swiss concerns. The English customers have, therefore, finally returned to these old suppliers. In spite of the tariff duties protecting the British Dyestuffs Corporation, this society was in danger and engaged in conferences with the president of the syndicate of German producers of dyestuffs. No agreement was made, because of the fact that the English society did not succeed in making acceptable to the German representatives the principle of absolute autonomy of the English dyestuffs industry corresponding to the needs of peace time as well as to those of war. The French Dyestuff Company has been able to come to the agreement of which I have spoken. Now, in France, we only import 15 per cent of our total consumption of dyestuffs."

PROPOSED REDUCTION IN TINTS AND COLORS IN WINDOW SHADE CLOTH

In accordance with the governmental economy move, one phase of which is the standardization of specifications for materials for all Government departments, there was held a meeting at the Bureau of Standards last spring on window shade cloth.

The following manufacturers were present: B. E. Bushell, Stewart Hartshorne Company, 250 Fifth Avenue, New York, N. Y.; E. R. Rabb, Columbia Mills, 225 Fifth Avenue, New York, N. Y.; Harry E. Bailey, Bailey & Weston, Boston, Mass.; Owen J. McMaster, McMaster & Mawgle Company, Inc., Philadelphia, Pa.

The following Government representatives were present: Treasury Department, office of Supervising Architect, N. McC. Sauber, Washington, D. C.; Navy Department, Bureau of Yards and Docks, Lieutenant R. E. Bassler, Washington, D. C.; General Supply Committee, schedule No. 3, R. H. Moses, Washington, D. C.; Post Office Department, J. W. Buck, Twelfth and Pennsylvania Avenue, Washington, D. C., and C. E. Warren, Room 516, Post Office Department, Washington, D. C.; Bureau of Standards, P. H. Bates, F. J. Meyer, F. R. McGowan.

The American Institute of Architects was represented by Edward W. Donn, Jr., 808 Seventeenth Street, Washington, D. C.

The purposes of the meeting were as follows: A reduction of the number of tints and colors produced by the manufacturers; a reduction in the number of widths of shade cloth produced by the manufacturers. A reduction in each of the above items would of necessity carry with it reduced stock and reduce overhead for the manufacturer, and reduce costs for the consumer.

It is expected that a meeting will be held in Washington in the near future at which concrete specifica-

tions will be offered for adoption and if approved, be put into effect as soon as possible.

This notice is being sent to the various trade journals in order that any of their subscribers interested may be fully aware of the progress made in this movement, and an opportunity given them to present any suggestions deemed necessary. People desiring further information in the matter should be referred to F. E. McGowan, Bureau of Standards, or R. E. Bassler, Lieutenant (J. G.) CEC., U. S. N., Bureau of Yards and Docks.

GAIN OR LOSS OF WEIGHT IN DYEING AND BLEACHING COTTON

Loss of weight in dyeing is due, in the first place, to the removal of the impurities of the raw material; and, secondly, to the degumming action of the assistants added to the mordant and dye baths.

The impurities referred to are not the dirt and dust which should be removed if the preparation for spinning is properly carried out, but are in the fiber itself without being an integral part of it. Cotton fiber in the natural stage contains 5 per cent of waxy and resinous matters which impregnate it and, in a measure, adhere to it. These are the pectic matters which are found in most vegetable substances and, far from being of an objectionable nature, they give the fiber flexibility and elasticity. They are hardly soluble in cold water; their presence prevents the cold bath from penetrating to the interior of the fiber. On the other hand, the prolonged action of boiling water softens or melts them; they either form an emulsion or are dissolved. Still, the use of hot water in wetting-out cotton takes too long a time to be practicable, and therefore alkalies are used. These easily and rapidly remove the pectic matters and allow the water to penetrate the fiber.

It is a general rule in dyeing to wet-out the fiber completely before introduction into the dye bath, and in this way to insure uniformity of absorption and penetration. This is specially necessary when dyestuffs or chemicals are used which are very rapidly absorbed. On the other hand, when a long process of dyeing at the boil is necessary the material may be entered into the bath without wetting-out, as the gradual action of the boiling bath allows the coloring matter to penetrate sufficiently and level dyeing is obtained.

It is evident, therefore, that the loss of weight of the cotton fiber in dyeing may be considerable, owing to the elimination of the waxy and resinous matter, more or less complete according to the effectiveness of the preliminary boiling out. If this has been done with caustic soda under pressure in the closed kier the loss may be 5 per cent, but if the material has been wet-out with a weak solution of Turkey red oil in the open vat at a moderate heat the loss may not be more than 3 per cent.

On the other hand, the cotton gains a little weight by the absorption of the mordant or dyestuff, varying according to the depth of shade and the nature of the coloring matter. For the direct cotton colors in deep shades it is necessary to deduct 2 to 3 per cent of the loss. Under these conditions, if the cotton has been thoroughly boiled out the 5 per cent loss will be brought down to 2 to 3 per cent. If it has simply been wet-out the loss will be brought down to 1 per cent after absorption of the coloring matter. It may be, in fact, that there is no loss at all; or, on the other hand, if a very light shade is obtained with a direct cotton color, the deduction for the amount of color absorbed may represent not more than a tenth or less per cent.

As regards the basic colors mordanted with tannin and fixed with tartar emetic, the mordant, reagent and coloring matter all increase the weight, from which must be deducted the loss in boiling out. For instance, if the cotton is wet-out with Turkey red oil so that there is not more than a loss of 3 per cent, the tannin will restore 2 per cent and the tartar emetic another ½ per cent; and, say, if Methylene Blue is the dyestuff, this will account for another 2 per cent increase, with the consequence that there is a final gain of 1½ per cent.

With sulphur black the final gain of weight may be 2 to 4 per cent. With the mordant colors, such as logwood black, Turkey red or the other alizarines, sometimes the increase of weight may reach 8 per cent, owing to the large quantity of mordant absorbed by the fiber.

In bleaching, the boiling, energetic washing and treatment with chloride of lime and acids eliminates not only the waxy and resinous substances but also a part of the mineral matters which enter into the constitution of the fiber. Thoroughly bleached cotton is therefore almost chemically pure cellulose. The matters thus removed represent a loss of about 6 per cent, from which must be deducted a slight increase due to the addition of softeners, which may be estimated at about 1 per cent. The final loss may thus be about 5 per cent.—L'Industrie Textile, through Cotton.

PLANS FOR NINETEENTH KNITTING ARTS SHOW PROGRESSING

Preliminary plans for the Nineteenth Annual Knitting Arts Exhibition to be held in Philadelphia April 2 to 6 are well under way. As in former years, the Exhibition will be under the auspices of the National Association of Hosiery and Underwear Manufacturers and the personal direction of Chester I. Campbell. The early demand for spaces has exceeded any previous year, and the situation indicates an event in the knitting arts trade that will bring thousands of buyers to Philadelphia with a result that the entire trade in all its branches will be greatly stimulated.

While machinery will be the foundation of the exhibit, yet it will not be confined to that. The yarn, needles and finished garments for both outer and under wear, hosiery, as well as other wearing apparel, will form a most important part of the exhibit.

Many applications are being filed for reservation of space, and it is predicted that a large portion of available

spaces will be taken when the first allotment is made. This allotment will take place the latter part of this month. "We are after business for the exhibitor as strong as we are after exhibitors," said Manager Campbell, "and the story written on the horizon indicates orders and publicity of great magnitude." Optomism prevails everywhere in the executive offices of the show, and surely the work being done and plans being formulated all tend toward a successful show.

CHEMICAL FOUNDATION, IN ANSWER TO GOVERNMENT SUIT, SHOWS LEGALITY AND OPENNESS OF EVERY ACT

The Chemical Foundation filed its answer to the suit of the Government in Wilmington, Del., on October 27. The answer is a comprehensive and emphatic denial of the Government's charges. It denies that the Chemical Foundation participated in any conspiracy or monopoly, or suppressed any information from the President or his representative Assistant Secretary of State Frank L. Polk, or paid an inadequate consideration for the patents, or did any act in bad faith or unlawfully. The answer, on the contrary, points out that before any patents were sold to the Chemical Foundation every material fact bearing upon the creation of the Chemical Foundation, its objects, its work and its doings was discussed in the official report made to the President by A. Mitchell Palmer as Alien Property Custodian on February 22, 1919, and transmitted by the President to Congress.

Situation Thoroughly Discussed Before Action

An extract from this report is annexed to the answer as an exhibit. From this report it appears that the whole plan concerning the Chemical Foundation and its taking over of the German patents was disclosed in detail. It is claimed in the answer, in addition, that not only were the President and Polk and Congress and the country generally advised of the plans which gave rise to the Chemical Foundation and the taking over by it of the German patents, but that Palmer as Alien Property Custodian also explained the situation personally to the President and to his representative Frank L. Polk, and that after such report and such explanation they made the orders authorizing and approving the sales, which the present administration now challenges and seeks to nullify.

The answer points out that the taking over of the German patents was necessary to the proper prosecution of the war against Germany, for the common defense in case of renewal of hostilities or future war, and for the emancipation of the American chemical industry from German control and domination. The answer narrates in detail how Germany had succeeded, by means of patents and otherwise, in obtaining complete control over the organic chemical industry of the United States. That meant that before the recent war Germany not only controlled the supply of dyes in the United States, but also the materials out of which poison gas, high explosives and important medicines like Salvarsan, the only known remedy for syphilis, were entirely in the hands of the Germans. The answer insists that in that situation the ability of the United States to manufacture high explosives and to defend itself according to the means and methods of modern warfare were at the mercy of Germany; that the ability of the United States to supply its citizens with important medicines was likewise at the mercy of Germany, and that many of its most important businesses were equally at the mercy of Germany. The report to the Alien Property Custodian, which was given to the President and which is annexed to the answer, shows how it was necessary to break this control of Germany over the chemical industry of the United States, if the United States was to have the power adequately to defend itself and protect its citizens.

Wilson Approved Plan

The President approved the policy of Americanizing the basic industries of the United States in order to overcome the German domination of those industries, the answer points out. To that end the Chemical Foundation was formed, after conference with the President and his representative Frank L. Polk, and with their approval, and after similar conference and approval, the patents in suit were transferred to the Chemical Foundation in order that it might hold and administer them in the interests of America and secure to the United States the permanent freedom of the organic chemical industry from German or other hostile foreign domination.

It further appears from the answer that on the President's return to this country the orders made by Polk were brought to his attention and that the matter was again considered by him, and that he thereupon made an order duly ratifying in all respects what had been done by Polk and the Alien Property Custodian.

Patents Are for Use of All Americans

The answer shows that the Chemical Foundation is not a private venture; that it has made and can make no profits for private persons; and that, on the contrary, it has expended thousands of dollars of its own capital to accomplish the public and patriotic purposes of President Wilson and its founders. Thus the Chemical Foundation is not like the ordinary owner of a patent, shutting out some persons from the use of it while giving others the right to use it as it sees fit. Under its charter and under its agreement with the Alien Property Custodian, the Chemical Foundation is required to and has and does license all American citizens who are qualified without discrimination and at equal rates and upon like terms.

The Chemical Foundation is also the means which was adopted to enable the United States to avoid having to pay heavy damages for patent infringements to Germans who had taken out patents of the United States, not in order to help American science and industry but to throt-

tle it. That was accomplished by having the patents sold to the Foundation and a release and license given by the Foundation to the Government.

The answer concludes by asking that the Government's complaint be dismissed.

TO DEDICATE STERLING LABORATORY AT YALE DURING CHEMICAL SOCIETY MEETING ON APRIL 4

The scientific meeting will be under the auspices of the New Haven and Connecticut Valley sections of the society. Prof. Treat B. Johnson of Yale is chairman of the executive committee in charge, chosen from members of the two sections.

Dedication ceremony, with probably 1,500 to 2,000 members of the American Chemical Society in attendance, as well as the Yale faculty and study body, probably will be one of the most impressive affairs of its kind ever held. The new building is one of the finest in the world and is built on an entirely new architectural principle. The main building is constructed on three sides of a square, three stories high and is in harmony with other buildings on the campus. In this building are class and lecture rooms, private laboratories and offices.

Inclosed in the square is a one-story, saw-tooth roof type of factory building, with movable partitions. This structure can be varied to suit the various needs of the teaching staff. It is constructed to give the maximum of light and air and equipped so that it can be converted into several small work shops or one large shop, equal in size to a small commercial chemical plant.

The following are chairmen of the several committees for the meeting: Program, T. B. Johnson; Finance, J. S. Gravely; Dedication, John Johnston; Registration, Blair Saxton; Arrangement, A. J. Hill; Hotels and Transportation, Ralph Langley; Smoker, P. T. Walden; Reception and Entertainment, C. H. Matthewson; Publicity, W. T. Reed; Ladies' Entertainment, Mrs. John Johnson.

The Chi chapter of Alpha Chi Sigma is to have charge of the information service of the meeting. Headquarters are Room 157, Sterling Chemical Laboratory, New Haven, Conn.

GOVERNMENT REPORT SHOWS DECREASE IN WOOL SCOURERS

Census reports show a considerable decrease in the activities of the establishments primarily engaged in the scouring of wool during the year 1921, as compared with 1919. In 1921 this industry reported products valued at $6,820,000, as compared with $13,680,000 in 1919.

Of the twenty-four establishments reporting for 1921, twelve were located in Massachusetts; three each in Illinois and Pennsylvania; two in California, and one each in New Jersey, New Mexico, New York and Oregon.

JAMAICA LOGWOOD

Logwood was introduced into Jamaica from Honduras in 1715 and was later planted in other parts of the West Indies. It will grow well on all soils, except loose sand and heavy clay, but it grows best and produces a finer heartwood on moist, rich soil where there is an abundance of vegetable matter. The climate must be hot, but not arid, although it has been found that when the plant becomes firmly rooted it stands a drought very well. Very little attempt is made to cultivate it, and most of the wood is cut from self-sown trees, which are usually found on waste lands unsuitable for cultivation.

Until quite recently, writes the United States Vice-Consul at Kingston, the production of logwood crystals has been very remunerative. A large dye works plant in Jamaica has been paying only £40 for sufficient raw material to make one ton of crystals, which sold in London for £200. An association of logwood growers has been formed, however, for the purpose of obtaining higher prices for their logwood. Pending the formation of this association, the demand for both logwood and crystals declined to such an extent that the local factories were forced to close down.

There are three works producing logwood extract in Jamaica, one in Spanish Town, one in Lacovia, and one in Savanna-la-Mar. The plant in Spanish Town is the largest. Its minimum crushing capacity is 20,000 tons per year, while the plant at Lacovia has a capacity of 12,000 tons per year. Figures are not obtainable for the plant at Savanna-la-Mar, as it was completely destroyed by fire shortly after its completion. It requires from eight to nine tons of logwood to produce one ton of crystals, and a somewhat less amount to produce one ton of liquid extract. Crystals are always shipped in casks containing 320 pounds, while the liquid is shipped in barrels containing 650 pounds.

The following table gives the exports of logwood and extract to the United States and the United Kingdom for the years 1918 and 1919:

Exported to—	Logwood Tons	Value £
United Kingdom:		
1918	1,360	4,894
1919	3,153	16,080
United States:		
1918	14,133	50,897
1919	13,298	71,032

	Logwood Extract Packages	Value £
United Kingdom ·		
1918	20,459	306,890
1919	22,090	331,800
United States:		
1918	550	8,250
1919	329	4,935

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In the classification enumerated below totals refer to firms engaged in the various occupations or to individuals known to be connected with such firms. Individuals whose occupation is unknown are included under Miscellaneous:

Commercial Dyers, Finishers and Bleachers	**496**	
Woolen Mills	**548**	
Broad Silk Mills	**102**	
Cotton Mills	**460**	
Knitting Mills (silk, wool and cotton)	**412**	
Total Textiles		**2,018**
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Leather Manufacturers	**82**	
Printing Ink and Dry Color Makers	**52**	
Dyestuff and Chemical Manufacturers and Dealers	**327**	
Miscellaneous	**491**	
Canada (chiefly textile manufacturers)	**118**	
Foreign (chiefly dyestuff importers)	**85**	
		1,464
Total		**3,482**

Included in the various textile classifications given above are 407 members of the **AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS,** for which body The Reporter acts as official organ. It was thought better to group the members under the different branches of the textile industry in which they are engaged than to include them as a single unit.

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